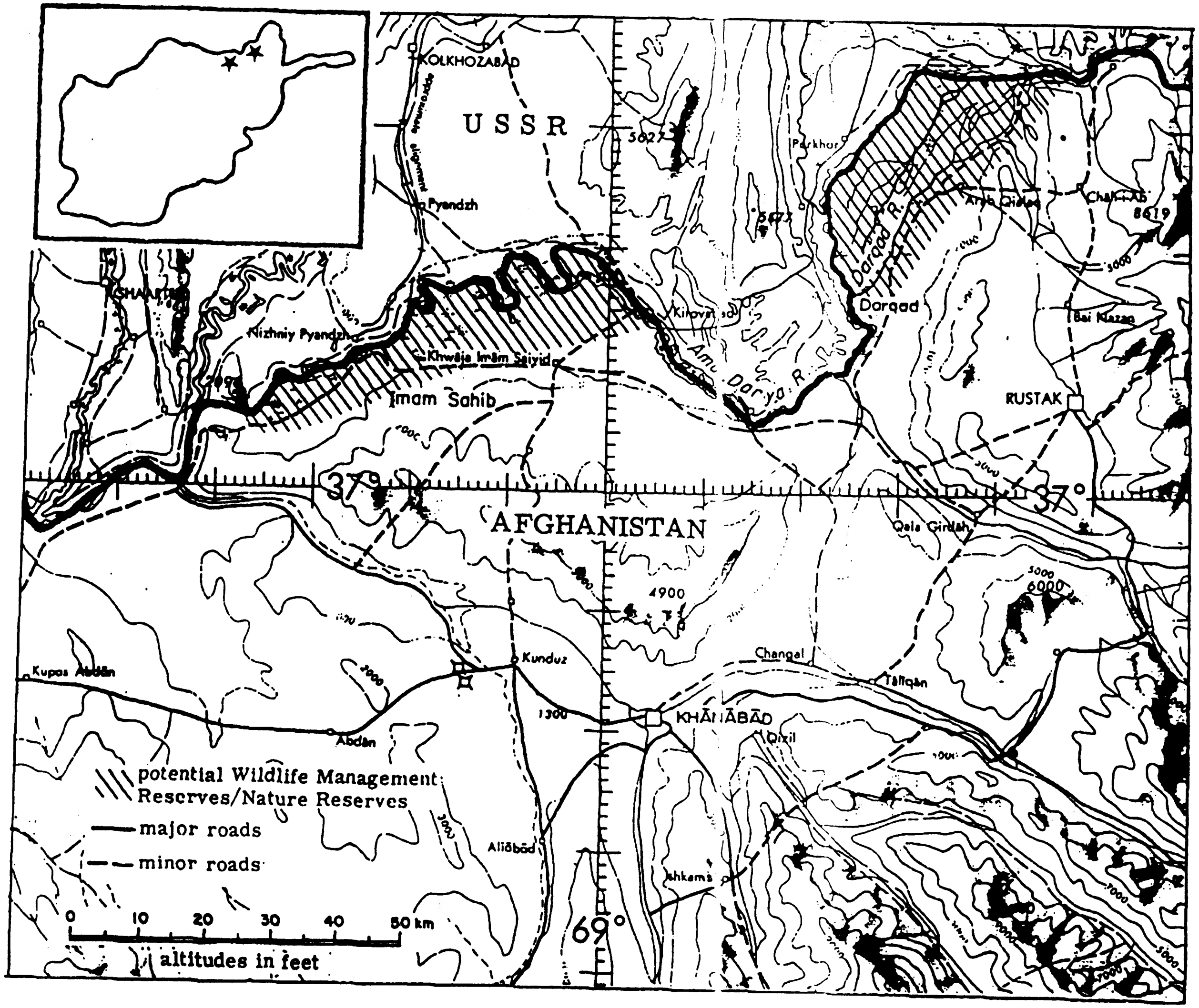
Map 23 Darqad and Imam Sahib



- Establish reserves and station guards. Provide them with living quarters and equipment.

- Establish legal boundaries and demarcate them in the field.

- Phase out occupation by farmers.

- Protect the Bactrian deer and the pheasant completely.

- Ban hunting in both areas.

5.2.10 Registan desert

Name: Registan desert.

Designation: Proposed wildlife management reserve/nature reserve.

Location: The Registan desert is located in the southeastern part of Afghanistan, to the south of Kandahar, in the Hilmand and Kandahar Provinces, 30°30'N, 65°E. Map 24.

Area: Location not yet determined.

Environment: Registan is the largest desert of Afghanistan with an area of 3 000 000 ha, situated between 800 and 1 200 m elevation. It is composed of a variety of landscapes from free-moving sands and dunes to gravel. The vegetation is poor and very open. Large herds of goitered gazelle (Gazella subgutturosa) and onagers (Equus hemionus) and probably common gazelles (Gazella dorcas) used to occur. The cheetah (Acinonyx jubatus), hyaena (Hyaena hyaena) and caracal lynx (Felis caracal) occurred in the past. Most of these animals are very rare or have been exterminated completely.

There are many rodents including jirds, gerbils and jerboas. Desert hare (Lepus capensis), sand boas (Eryx johnii) and vipers (Echis carinatus) also occur.

Status: Rangeland under a traditional grazing regime.

Value: Desert ecosystem with a potentially rich flora and fauna.

Conservation problems: Heavily overgrazed range. Establishment of more watering points will encourage more livestock and consequently further range deterioration. Hunting has been responsible for eliminating the larger mammals.

Action plan:

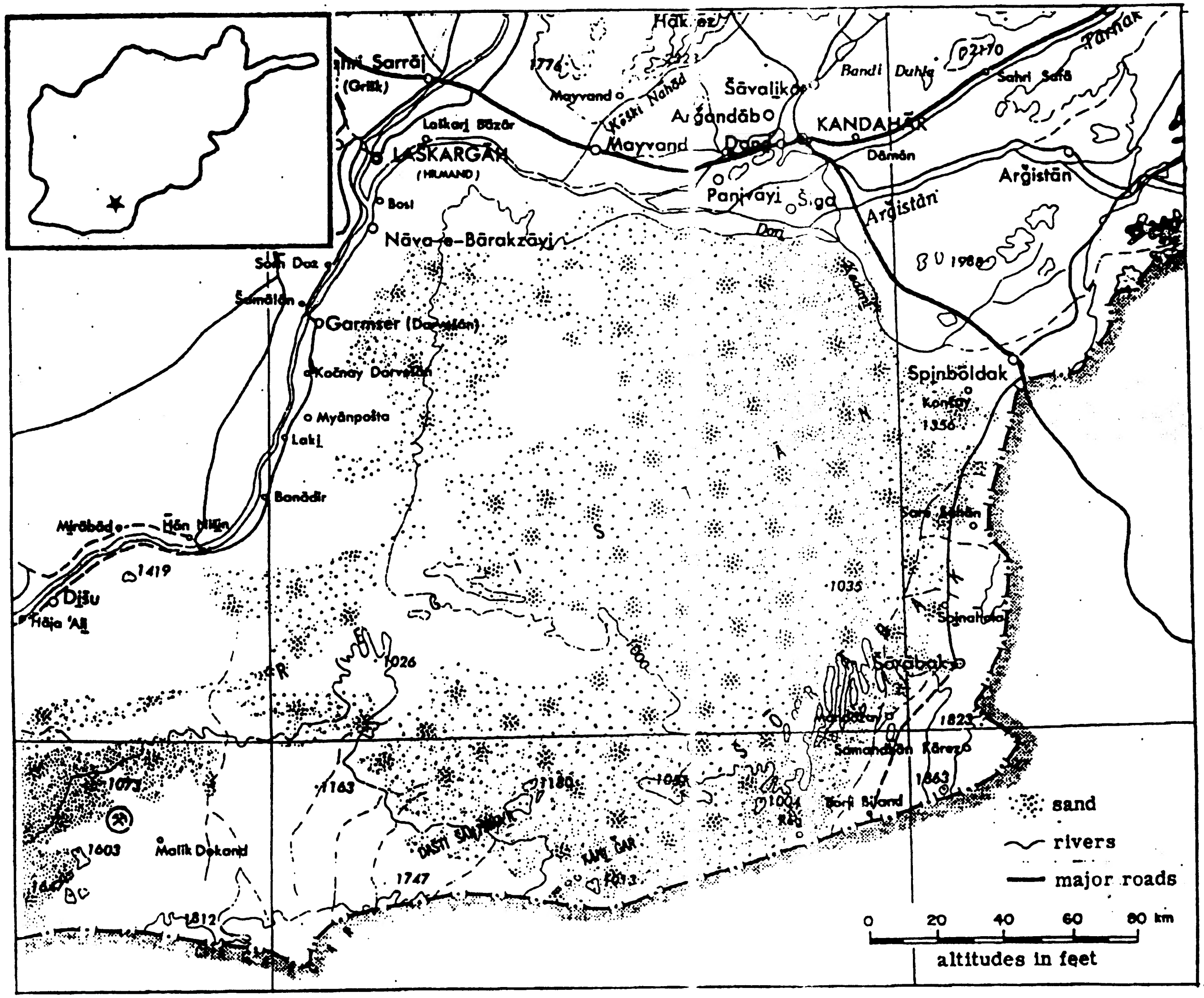
- Survey the Registan desert to select a large area which represents all the desert ecosystems and harbours a rich fauna.

- Prepare a preliminary management plan and establish boundaries.

- Initiate range research and a pilot range management programme in connection with the reserve.

- Maintain captive herds of desert ungulates and the wild ass.

Map 24 Registan Dese.t



5.2.11 Northwest Afghanistan

Name: Northwest Afghanistan.

Designation: Proposed game management reserve/nature reserve.

Location: Herat and Badghis Provinces near the Soviet border, approximately 100 km north of Herat, 35°10'N and 62°E. Map 25.

Area: Location not yet determined.

Environment: *Pistacia vera* woodlands on higher land and *Artemisia* steppe on the lower northern slopes with an elevation between 500 and 1 000 m. Although detailed surveys in the area have still not been carried out local people report onagers (*Equus hemionus onager*). They apparently cross the Afghan-Soviet border from a neighbouring Soviet reserve. Urial (*Ovis orientalis*) are probably quite common and Persian wild goat (*Capra aegagrus*) occur in the hills and mountains.

Status: Rangeland with traditional grazing practices.

Value: Representative area of the northern *Artemisia* steppe and *Pistacia vera* woodland. Formerly the steppes had large herds of onagers and goitered gazelles (*Gazella subgutturosa*) but unlimited hunting and severe competition with domestic livestock have reduced their numbers. Cheetahs (*Acinonyx jubatus*) may still occur here.

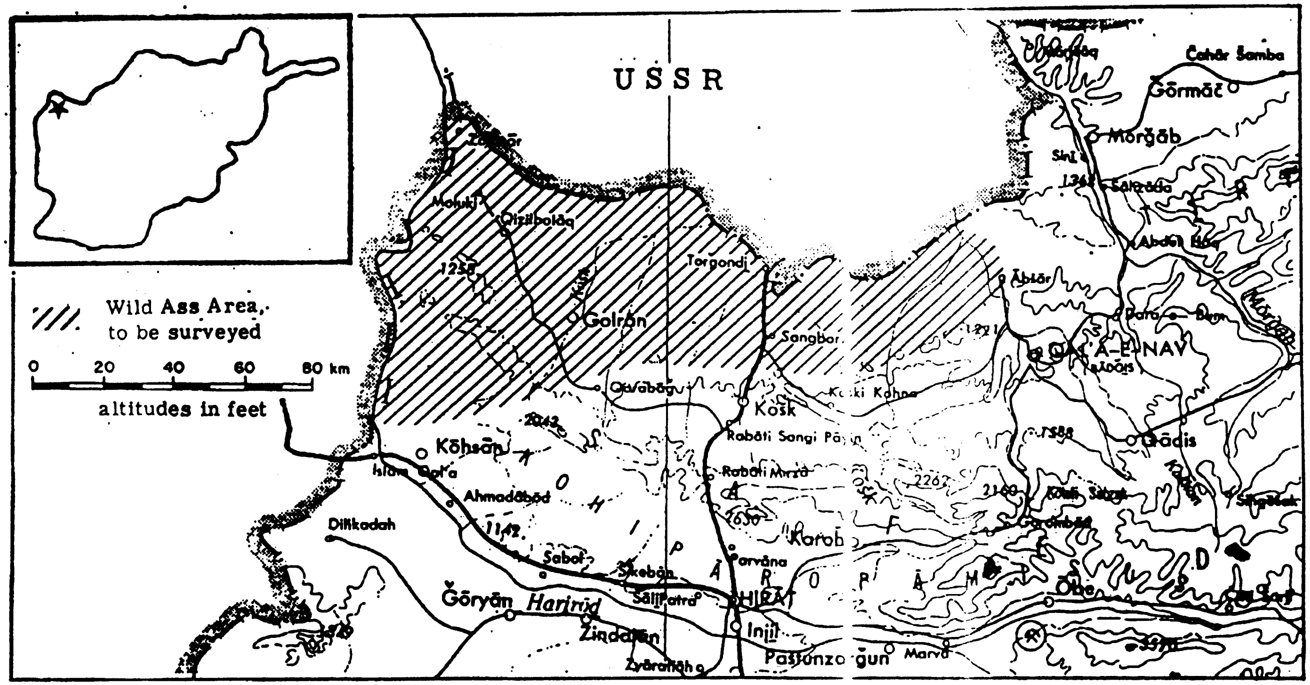
Conservation problems: Hardly any information is available on these areas but there is probably a lot of hunting.

Action plan:

- Organize preliminary surveys of the area where the onagers were reported and of the *Pistacia vera* woodlands. Assess the population of onagers and goitered gazelles and determine the most suitable area in which to protect them.
- Establish reserves and demarcate the boundaries.
- Station guards in the area and prevent hunting of onagers and goitered gazelles.
- Prepare a preliminary management plan.

Map 25

Northwest AFGHANISTAN



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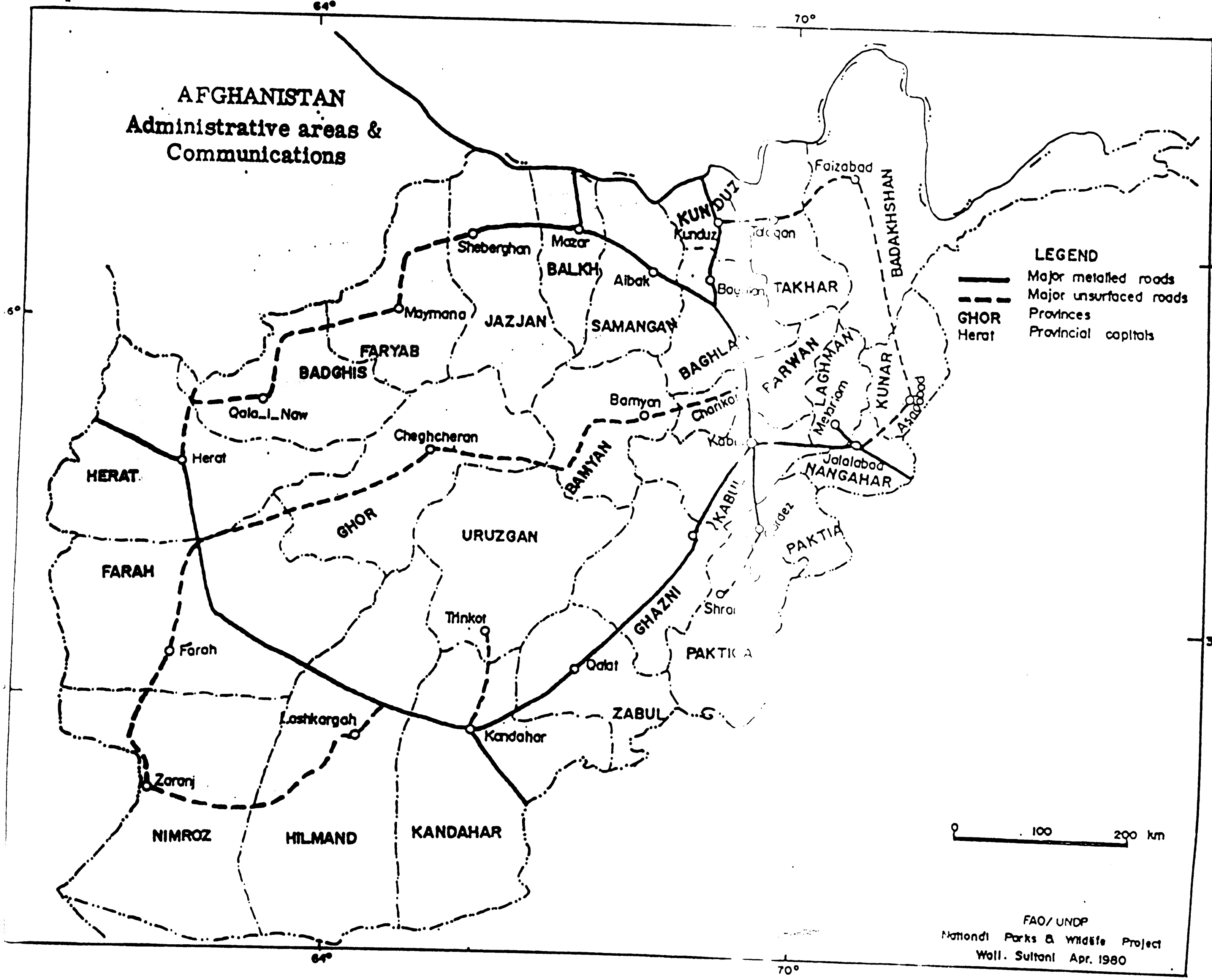
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Map 2


AFGHANISTAN
Administrative areas &
Communications
LEGEND
Major metalled roads
Major unsurfaced roads
GHOR Provinces
Herat Provincial capitals
HERAT
FARAH
NIMROZ
HILMAND
KANDAHAR
BADGHIS
FARYAB
JAZJAN
BALKH
SAMANGAN
KUNDUZ
TAKHAR
BADAKHSHAN
BAGHLAN
PARWAN
LAGHMAN
KUNAR
NANGAHAR
BAMYAN
GHOR
URUZGAN
GHAZNI
PAKTIA
PAKTICA
ZABUL
Faizabad
Kunduz
Shebherghan
Mazar
Aibak
Maymana
Qala_i_Naw
Herat
Bamyan
Charikar
Cheghcheran
Kabul
Jalalabad
Mehtarlam
Asadabad
Farah
Trinkot
Qalat
Lashkargah
Kandahar
Zaranj
0 100 200 km
FAO/UNDP
National Parks & Wildlife Project
Wali Sultani Apr. 1980

1.2.2 Demography

The population was estimated to be 14.5 million in 1979; 10.0 million live in rural areas, 2.5 million in the 87 municipalities and 2.0 million are nomads (Map 3).

A recent World Bank report predicted that with a growth rate of 2.2% and existing patterns of fertility and mortality, the population in 2025 would be between 42.9 and 69.3 million, with a most probable figure of 60.7 million. However, it seems likely that the present growth rate of the population is much less than the 2.2% postulated. Many of the country's resources are already exploited to the limit and the dramatic increase in population predicted by the World Bank could not be supported by the present economic system. Any further growth of the population will pose serious threats to the natural environment and it is to be hoped that the Government will match its social and medical programmes, which tend to increase longevity, with similar programmes to reduce births.

The intensity of use of the country's resources is determined by the size of the population, and the magnitude of many of the problems discussed in this report will be strongly influenced by future demographic trends. Table 1 shows the possible effects of declining fertility and increasing longevity on future populations of Afghanistan. Even taking the most conservative estimates of future population levels it must be concluded that the finite agricultural and fuel resources of the country will have to provide for many more people in the near future. An effective programme to limit population is fundamental to the conservation of the natural environment of Afghanistan.

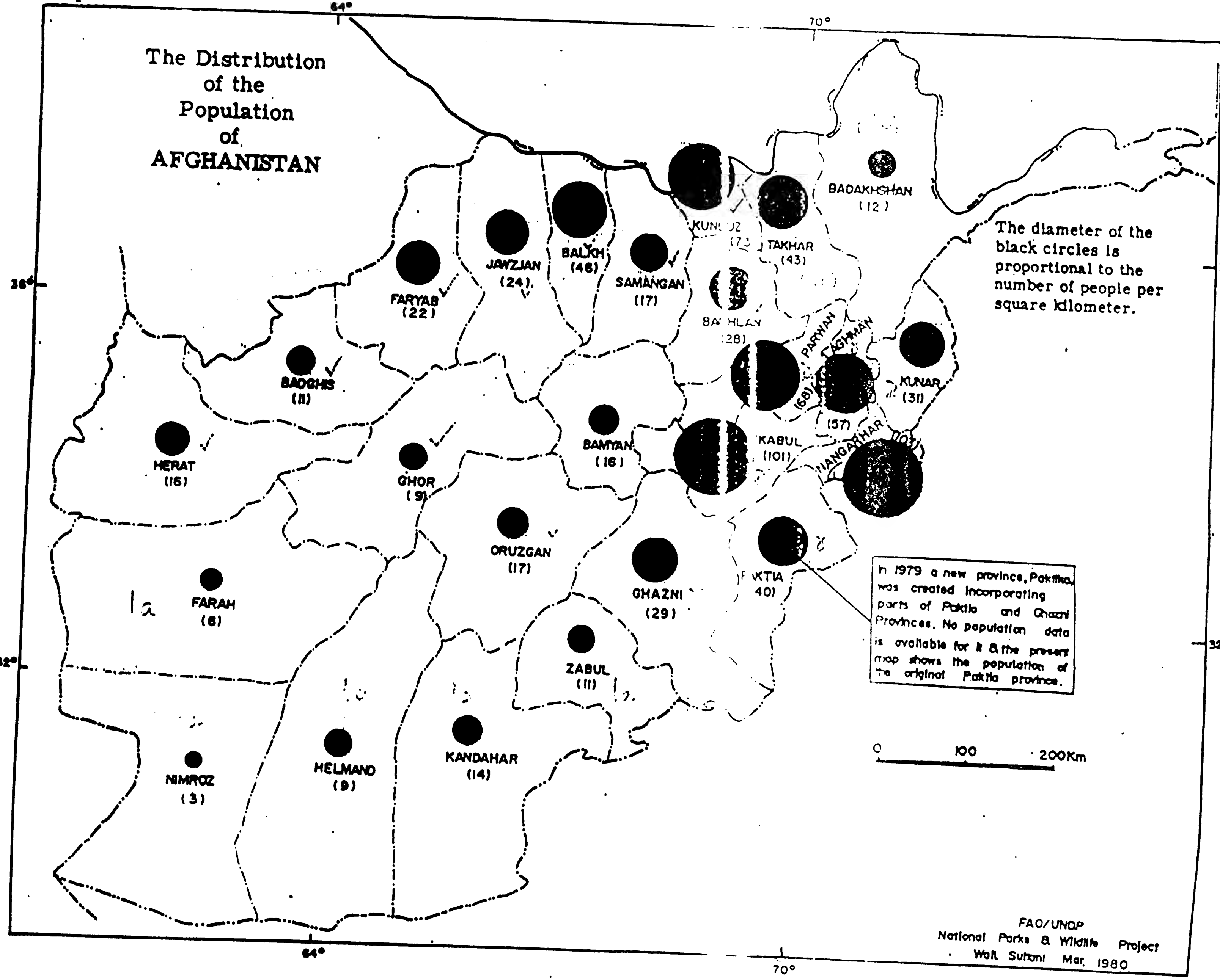
The labour force is estimated to be 5 618 000, the majority of whom work in agriculture or in the transformation of agricultural products (Table 2).

1.3 THE ECONOMY

1.3.1 Introduction

Afghanistan has a per caput GNP of $180 per annum (World Bank Atlas, 1978) and the real growth rate for the period 1970-75 was 2.6% per annum. Agriculture is the main economic activity of the country followed by natural gas exploitation and the manufacture of carpets and rugs. The values of the principal exports are given in Table 3. Most industry is concerned with transforming agricultural produce. Carpet manufacture from wool is the most important and is concentrated in the north of the country. There is a sugar factory at Baghlan and an abattoir and meat processing plant at Herat. A few import substitute industries exist; they include a fertilizer plant at Mazar-i-Sharif which uses natural gas as a raw material and pharmaceuticals in Kabul.

Map 3



The Distribution of the Population of AFGHANISTAN
The diameter of the black circles is proportional to the number of people per square kilometer.
BADAKHSHAN (12)
TAKHAR (43)
BALKH (46)
JAWZJAN (24)
FARYAB (22)
SAMANGAN (17)
BADGHIS (11)
HERAT (16)
GHOR (9)
BAMYAN (16)
KABUL (101)
KUNAR (31)
ORUZGAN (17)
GHAZNI (29)
FARAH (6)
ZABUL (11)
NIMROZ (3)
HELMAND (9)
KANDAHAR (14)
PARWAN (68)
(57)
NANGARHAR
In 1979 a new province, Paktika, was created incorporating parts of Paktia and Ghazni Provinces. No population data is available for it & the present map shows the population of the original Paktia province.
0 100 200Km
64°
70°
36°
32°
FAO/UNDP
National Parks & Wildlife Project
Walt Suhoni Mar. 1980

Table 1

POPULATION ESTIMATES FOR AFGHANISTAN, 1975-2025
(millions)

	Settled population			Nomadic population	
	Projection I	Projection II	Projection III	High estimate	Low estimate
1975	12.0	12.0	12.0	1.4	1.4
1980	13.4	13.4	13.5	1.5	1.5
1985	15.0	15.2	15.5	1.7	1.6
1990	16.0	17.5	18.0	2.0	1.8
1995	19.2	20.3	21.1	2.4	1.9
2000	21.7	23.5	24.9	2.8	2.1
2005	24.5	27.5	29.5	3.3	2.3
2010	27.7	32.4	35.2	3.9	2.5
2015	31.3	38.6	[illegible]	4.7	2.7
2020	35.4	46.2	51.3	[illegible]	[illegible]
[illegible]	39.9	55.5	62.4	6.9	3.3

Projection I — Ineffective public health programme and no population programme.

Projection II — Effective health programme and effective population programme.

Projection III — Effective health programme and ineffective population programme.

Source: World Bank, 1978.

Table 2

DISTRIBUTION OF THE LABOUR FORCE, 1975-76

	Number	% of total
Agriculture	4 022 000	71.6
Industry	350 000	6.2
Mining	100 000	3.4
Non-productive	715 000	12.7
Unemployed	343 000	6.1
	5 618 000	**100.0**

Source: Economist Intelligence Unit, 1979.

1.3.2 Agriculture

Over 50% of the population is directly engaged in agriculture and a further 25% is involved in the transformation of agricultural products. Agriculture in its various forms is the most powerful force in shaping the Afghan environment. Table 4 gives an approximate categorization of the types of land found in Afghanistan together with a breakdown of the way in which this land is actually used. Table 5 shows the average area used for the principal crops. Wheat is the main food crop, covering 25% of the area, with an average yield of 2.8 million t per year (1976-78). Arable agricultural holdings are traditionally small; the average size at the time of the 1967 agricultural census was 3.7 ha, but 70% of the holdings were smaller than this, the average being raised by a small number of large land-owners. One of the major innovations which followed the 1978 revolution was the introduction of land reform which limited individual land holdings and provided for redistribution of excess land.

1.3.3 Livestock

The livestock industry is very important; the majority of Afghans derive their living from the animal products of natural rangelands. Some 54 700 000 ha (84% of the land area of Afghanistan) are classified as permanent pastures. Estimates of the total numbers of livestock using this land are given in Table 6.

At present livestock are exploited at the family and village levels; export has been largely limited to wool and hides and their manufactured derivatives. No organization has been responsible for the export of meat, and herdsmen have tended to keep animals surplus to domestic needs. This has resulted in periodic build-ups in total livestock numbers in the country inevitably followed by crashes caused by disease or drought. Most livestock are exploited domestically. Annual per caput consumption of meat is 11.5 kg and of milk 60 kg (World Bank, 1978).

Animal products (wool, hides, skins, Karakul pelts, etc.) make up 15% of the value of all exports. Woollen carpets make up a further 7%. There is enormous potential for the expansion of exports of these products. The development of an export-orientated livestock industry would favour a rationalization of production. This would entail an improvement in range management practices and would therefore be environmentally beneficial. The best initiative in this direction is the World Bank-supported Herat Livestock Development Commission (HLDC) which aims to provide slaughter facilities for up to 12.5% of the domestic sheep population each year. The carcasses would be marketed in Iran. This project would not only be valuable economically but would also have ecological benefits in helping to stabilize livestock numbers at a productive level and eliminate the periodic overstocking and the range degradation that results.

Table 3

MERCHANDISE EXPORTS
(million US$)

	1975/76	1976/77	1977/78
Offal	1 314	1 763	2 310
Fresh fruit	23 195	23 204	22 874
Dried fruits and nuts	47 261	60 127	83 840
Hides and skins	12 138	12 598	11 448
Karakul skins	10 351	10 803	18 443
Wool	7 980	7 212	6 179
Cotton	31 558	60 705	55 040
Carpets	16 738	23 499	38 408
Oil seeds	8 251	11 380	3 618
Medical herbs	10 436	8 635	17 761
Natural gas	45 342	39 600	39 300
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Source: Central Statistical Office, quoted in EIU, 1979.

Table 4

CATEGORIES OF LAND
('000 ha)

Type of land	Area	Land use	Area
Arable	7 910		
Uncultivated	3 900	Uncultivated	3 900
Cultivated	4 010	Irrigated 1/	2 586
		Rainfed 1/	1 424
Permanent crops	372	Tree crops	372
Permanent pasture	54 700	Grazing	54 700
Forest (Inc. productive conifer forest)	1 900 (84)	Forest	1 900
		Summer grazing	22 460
		Winter grazing	16 210
		Non-agricultural	381
Total land area	65 263		65 263

1/ Of the irrigated land 26% is estimated to be fallowed annually while 40% of rainfed land is fallowed.

After: Ministry of Planning.

Table 5

AVERAGE CROP AREA, 1971/72-1976/77
('000 ha)

	Irrigated	Rainfed	Total
Wheat	1 314	1 096	2 410
Maize	479	-	479
Rice	208	-	208
Barley	110	211	321
Seed cotton	93	-	93
Sugar-beet/cane	7	-	7
Oil seeds	19	36	55
Vegetables	100	-	100
Fruits	138	-	138
Alfalfa, clover	60	-	60
[illegible]	75	-	75
Total under crops	**2 603**	**1 343**	**3 946**

After: Ministry of Planning.

Table 6

ESTIMATED LIVESTOCK POPULATIONS OF AFGHANISTAN, 1979

Cattle	3 400 000
Sheep	19 000 000
Goats	2 700 000
Buffalos	40 000
Equines	432 000
Camels	300 000

Source: Ministry of Agriculture, 1979.

1.4 ENERGY

Afghanistan is amongst the ten lowest countries in the world in per caput consumption of conventional energy sources (World Bank, 1978). Fossil fuels and hydropower used in 1976/77 amounted to 43 kgCe (kilogrammes standard coal equivalent) per caput. The breakdown of energy production is shown in Table 7.

In addition, a large amount of domestic energy is derived from firewood, charcoal and agricultural and animal waste. Published figures differ for the amount of such traditional fuels used. FAO estimates per caput consumption of fuelwood (including wood converted to charcoal) to be 180 kg/year 1/. Eskilsson (1966) estimated total per caput consumption of all traditional fuels at about 33 kg/year. Synnot (1978) estimated that per caput consumption in Herat was over 1 000 kg/year and that nomads might use up to 4 000 kg/year wood equivalent of shrubs and animal waste.

The discrepancies in these figures illustrate the urgent need to collect better information on fuelwood. In reality a large proportion of the people in Kabul and almost the entire rural population depend entirely on wood (including that obtained from shrubs) and animal waste for domestic fuel. The figures given by Eskilsson are obviously too low. The FAO figure of 180 kg per caput refers only to [illegible] and does [illegible] waste, so it would not necessarily conflict with Synnot's figure of 1 000 kg, a large proportion of which is derived from shrubs and animal waste. In spite of the doubts about actual consumption most people agree that forests are being exploited at far above their sustainable yield and the widespread use of shrubs is a cause of range deterioration. This problem is discussed in more detail in the sections on forests and rangelands (Sections 3.2 and 3.3).

Estimated reserves of fossil fuels and hydropower are given in Table 8. On the basis of the lower estimates, coal reserves will last for 2 000 years at present consumption rates. The existing natural gas fields will last only 30 years. However, gas and petroleum exploration are far from complete and further reserves will certainly be located. There is a large amount of unused hydropower potential, but 50% of this is on the Amu Darya and would have to be exploited jointly with the Soviet Union.

With the exception of the gas which is exported to the Soviet Union, coal is the cheapest form of energy available in Afghanistan. It is 8-10 times cheaper per unit of heat produced than firewood. Coal is not widely used domestically because of supply difficulties; mining is inefficient and marketing procedures are cumbersome. Probably the single most effective way of conserving the forest resources of the country would be for the Government to actively promote the use of coal as a domestic fuel. This would also help reduce imports of diesel oil and kerosene.

Fossil fuel and hydropower resources are in general not situated near to the main centres of power consumption. There is a surplus of power production potential north of the Hindu Kush Mountains and a deficit to the south. Much more efficient use could be made of resources if a national grid system were available to redistribute electricity. Seasonal shortfalls

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1/ All figures have been converted to kg wood equivalent on the basis of a 1978 population of 14.5 million and 1 t wood = 0.6 t coal and 1 m^3 wood = 0.6 t wood.

Table 7

PRODUCTION OF ELECTRICITY, COAL, NATURAL GAS AND PETROLEUM

	1973/74	1974/75	1975/76	1976/77	1977/78	1979/80 Planned output	1983/84 Planned output
Electricity 1/ in mn kWh	525	482	716	696	764	-	1 381
Coal in '000 t	113	153	145	160	174	-	523
Natural gas in mn m^3	2 735	2 940	3 000	2 546	2 548	-	3 000
Petroleum in '000 t						15.0	16.0

1/ Mostly generated by hydroelectric [illegible] diesel generators.

After: Economist Intelligence Unit, 1979, 1980.

Table 8

TOTAL ENERGY RESERVES

	Projected total energy reserves		Known energy reserves	
	Low estimate	High estimate	Low estimate %	High estimate %
Coal	329	640	59	73
Natural gas	147	147	26	17
Petroleum	12	17	2	2
Hydropower	74	74	13	8

Primary energy reserves in 10^6 t standard coal equivalent.

After: Economist Intelligence Unit, 1979, 1980.

in hydropower production in the Kabul area could then be made up from thermal power stations situated near the natural gas or coal producing areas. Similarly, the hydropower potential of the Amu Darya could only be exploited economically if it were possible to use it over a very wide area. There are of course considerable technical difficulties in constructing power lines over the intervening high mountain ranges.

In many remote areas, shrubs and animal waste are important fuel sources. Excessive use of the first lowers the productivity of rangelands and creates a soil erosion hazard. Use of animal waste deprives the agricultural land of manure. It would be quite unrealistic to try and provide electricity to such communities via a grid system and the transport of coal would in many cases present logistical problems. The Afghan environment does however lend itself to the development of several alternative energy technologies. In particular there is potential for much wider use of micro-hydroelectric power generators in mountainous areas.

The altitude and weather over much of Afghanistan are very favourable to the use of solar power for domestic heating and power generation. Almost no use is yet made of this resource and little knowledge of the technology is available within the country. The Government should give high priority to [illegible] [illegible]gy.

ACTION PLAN - CONCLUSIONS AND RECOMMENDATIONS

This strategy deals with the conservation of the natural ecosystems in Afghanistan. It gives guidelines for using the Afghan biosphere to yield the greatest benefit for present generations while maintaining its potential for future generations. It deals with plants, animals and micro-organisms and with those non-living elements of the environment on which they depend.

The Afghan biosphere is varied, ranging from deserts to high mountains and monsoon forests. It has a great variety of valuable and interesting ecosystems and species.

Traditionally the dependence of rural communities on living resources has always been direct and immediate. They used the shrubs of the deserts for fuel and fodder. When populations were small, however, people lived in balance with their environment; now they burn the cattle dung and crop-wastes which are badly needed for soil regeneration. Overgrazing by domestic animals [illegible] many cultivated plants and animals originate from wild ancestors from the Middle East and for their future genetic improvement the conservation of these ancestors is necessary.

The strategy has the following goals:

- to maintain essential ecological processes and life support systems on which human survival and development depend;
- to preserve genetic variety;
- to ensure sustainable utilization of the species and ecosystems.

The main conclusions and recommendations are as follows.

A. RANGELANDS

A majority of the Afghan people depend on rangelands for their livelihood. In many areas this vital economic resource is being degraded by over-use, especially over-grazing along the major migration routes of the nomads, dry-land cultivation and uprooting of shrubs. These ranges are extremely sensitive to desertification.

<u>Recommendations</u>

- Establish representative protected range areas in arid, semi-arid and mountain areas. Introduce experimental systems to study management practices for restoring the potential of the ranges. Encourage rotational grazing and control of stocking rates. Emphasis should be put on areas with high human and animal densities.

2. GEOGRAPHICAL AND BIOLOGICAL BACKGROUND

2.1 PHYSICAL ENVIRONMENT

2.1.1 Climate

Afghanistan has a continental climate strongly influenced by topography and affected by the monsoons in the east and by Mediterranean disturbances. Differences between summer and winter temperatures are very great.

Towards the end of May the high temperatures and consequent low atmospheric pressure found in the deserts of Pakistan cause the SW monsoon and the summer rains in India. The monsoon moves northwestwards along the Himalayas into the extreme east of Afghanistan, it occasionally causes summer rain in Kabul. The low pressure zone over Pakistan and the sub-tropical high pressure zone over the Mediterranean give a very dry and stable northwesterly to southerly wind for the rest of Afghanistan.

In September the SW monsoon disappears and is replaced by a north-easterly air movement which becomes important by January. This brings rain in southeast and south India and some rain in Pakistan and Afghanistan on the windward slopes. During the winter disturbances originating in the Mediterranean begin to affect the climate. Although the surface circulation is controlled for long periods by the Asian high pressure zone and dominated by NE winds, frequent cyclones formed in the Mediterranean penetrate eastwards into the area and bring almost all the winter precipitation.

In the winter the winds are not generally very strong but there are sometimes storms in Seistan. In the summer a strong, extremely dry northerly wind blows, especially in the west and south.

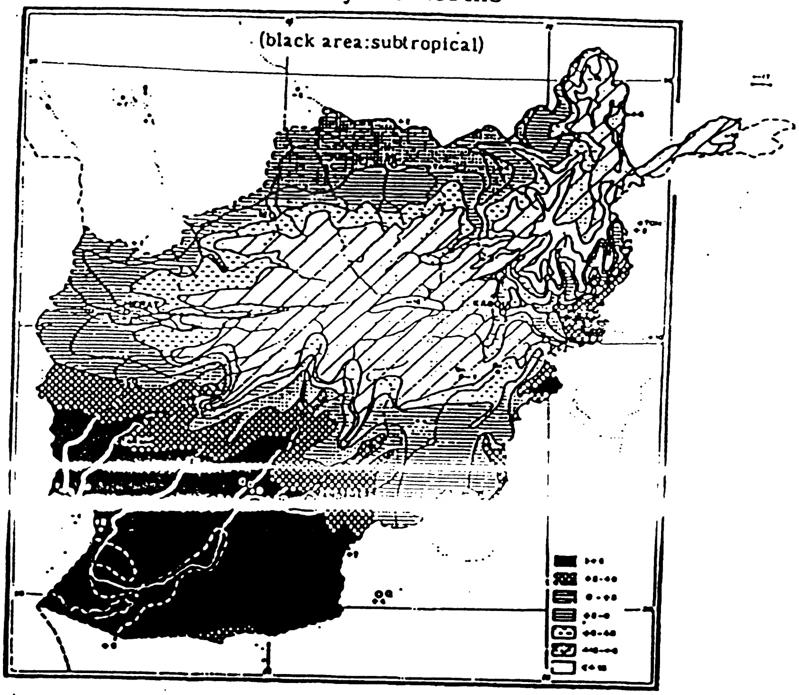
At this time small local cyclones are formed in the afternoons.

2.1.1.1 Temperatures

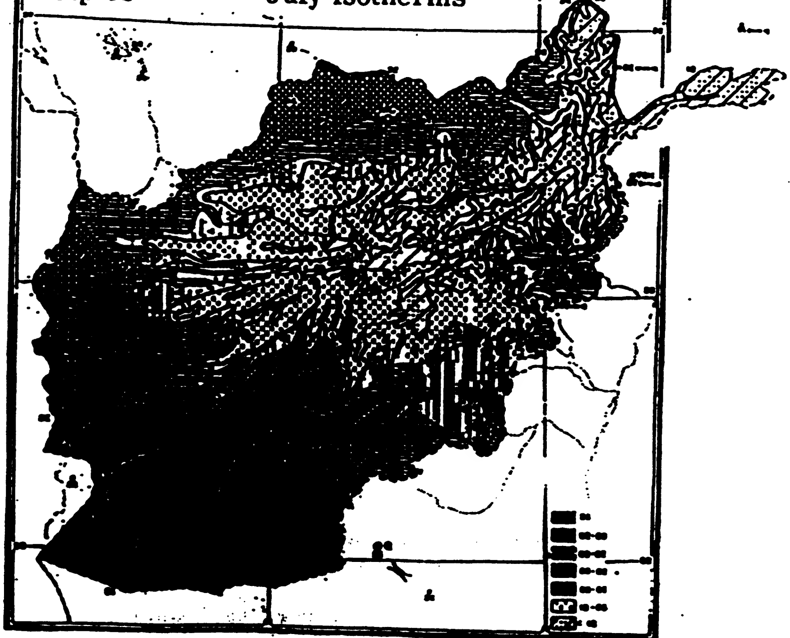
The summer is hot, especially in the sub-tropical south and east and the Amu Darya valley in the north, with an average July temperature of 32-35°C. The north and west and the lower Kabul valley have a mean maximum July temperature of 28-32°C. The mean for the town of Kabul is 24°C with a highest measured temperature of 37.7°C. The 11°C July isotherm forms the theoretical limit of forest border in the Hindu Kush and is on 4 000 m altitude. Permanent snow occurs above 4 500-5 000 m in Nuristan and the Pamirs. The temperature differences between day and night, especially under cloudless conditions in the deserts, are extreme.

In winter, the highest temperatures are found in the Helmand basin with a January average of 9-10°C (Map 4). The 5°C January isotherm forms the limit of the sub-tropical region; it lies just south of Farah-Kandahar and includes the lower Kabul and Kurram valleys. Even in the north along the Amu Darya the average January temperature is [illegible] but in the high Pamir it is below -15°C

Map 4a January isotherms



Map 4b July isotherms



Numbers indicate degrees centigrade
The maps are based on altitudinal lines
and should be taken as an approximate
indication of the temperature regimes

2.1.1.2 Precipitation

The driest areas are Seistan and the high Pamirs with an annual precipitation of between 5-10 cm; the Amu Darya valley with 12-15 cm is also very dry. The more densely populated low lying areas of Afghanistan receive 15-20 cm and above 1 000 m in the Hindu Kush precipitation is more than 20 cm. The most humid areas are the eastern mountains which receive monsoonal summer rains of up to 100 cm. Darqad in northern Badakhshan also receives more than 40 cm (Map 5).

In drier areas relatively great annual variation in precipitation occurs. In Kabul, with an annual average rainfall of 30 cm, the precipitation varies between 20.7 and 49.0 cm; in the Helmand valley, with an average of 10 cm, there are much greater fluctuations and some years are completely dry.

Throughout Afghanistan a large proportion of the precipitation falls as snow. In the south and east snowfall is infrequent and light and the snow melts rapidly. In the mountains of Nuristan and central Afghanistan, it remains for long periods. Very little snow falls in the Pamirs.

[illegible]

The only river in Afghanistan whose water eventually reaches the sea is the Kabul river which discharges into the Indus. All the others flow into continental depressions from which water is lost by evaporation. These depressions consequently contain saline lakes and marshes. Their extent varies greatly both seasonally and from year to year depending on the volume of the rivers.

Most rivers flow out radially from the central mountains. The rainfed rivers are often dry for much of the year. Those supplied by melting snow flow for longer and reach their maximum volume in late spring and summer.

Many of the rivers transport large quantities of eroded material. It has been estimated that when in spate the Helmand river transports up to 4 million t of material in 24 hours.

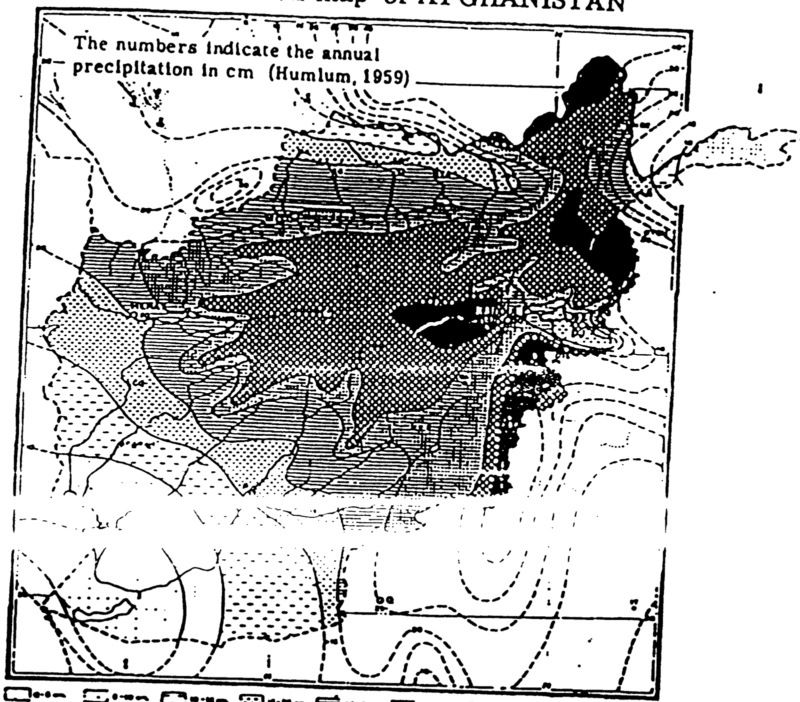
Many Afghan rivers are controlled for irrigation purposes. Large-scale modern irrigation schemes have deprived many natural wetlands of water. The Seistan wetlands are therefore much less extensive now than they were in the recent past. Man-made underground canals are used to transport water over quite long distances in dry mountainous areas.

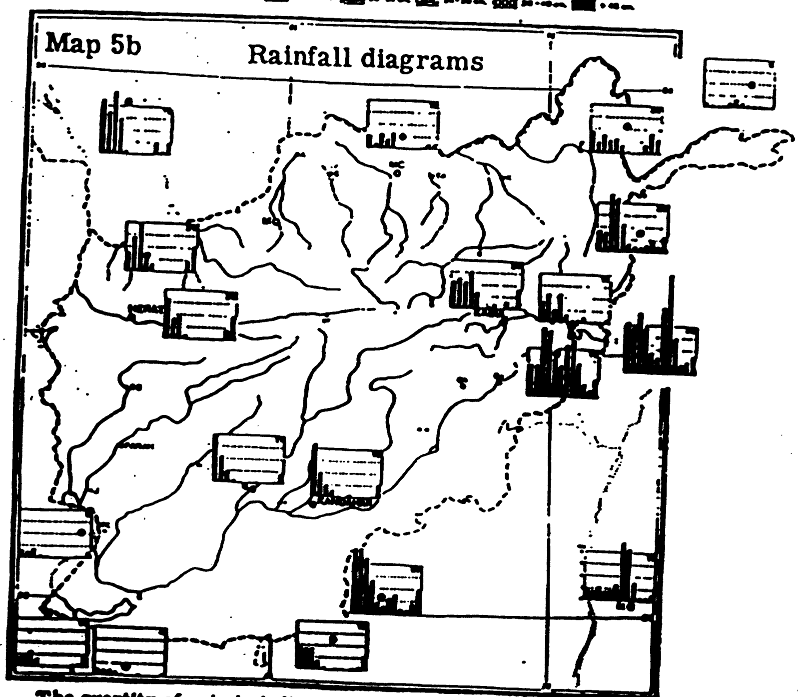
2.1.3 Geology

2.1.3.1 Geological history

The mountains of Afghanistan were created by the collision of the Indian and Arabian plates with the old Eurasian continent (Angaraland). During the Cretaceous (± 140 million years) the northern part of Gondwana land, the southern continent, experienced a period of intense volcanic activity associated with deep-seated faulting. Several thousand square kilometres were covered by lava, the mass of which upset the balance of the earth's crust. The Gondwana continent split and the Indian and Arabian

Map 5a Rainfall map of AFGHANISTAN





**The quantity of rain is indicated in cm for each month.
The height of the frame corresponds to 4 cm of rain,
and precipitation is given in the top right hand corner.
The black spots indicate the exact location of measurement.**

(Humlum, 1959)

plates moved north through the ancient Tethys sea. In the late Cretaceous the Indian plate contacted Asia. This and the great disbalance caused by the mass of erupted lava caused the Eocene rising and folding phase of the Tethys Geosynclinal.

During the Oligocene and Miocene periods (25 million years) a strong subduction of the Indian and Arabian plates caused the main Himalayan folding and the uplift of the Hindu Kush. A third upheaval occurred at the end of the Pliocene.

The Pamirs are a result of the northwestern spur of the India plate which caused the northwards bulge. The Himalayan range continues south of the Pamirs in the Hindu Kush. The mountain building processes, which began in the Eocene, are still active, as shown by the frequent earthquakes.

2.1.3.2 Geomorphology

Afghanistan is part of the Tethys Geosynclinal. It can be sub-divided into the following regions:

i. The Pamirs form a part of the Kashmir Himalayas. Precambrian rocks are dominant such as gneisses, granites, quartzites and schists. A central [illegible] of granites and granodiorites extends from the Pamir, through the Hindu Kush, north of Bamian to Herat.

ii. The Hindu Kush consists of two parallel west-east running ranges, the central Hindu Kush range with the Paropamisus in the north and the Koh-i-Baba range in the south. The highest parts of the Hindu Kush have precambrian crystalline rocks flanked by metamorphic Palaeozoic rocks which cover extensive areas. The lower parts consist of limestone, sandstone, marl and clay of tertiary age. The northern plains are quarternary formations mainly of sand and loess.

iii. The Elburz mountain system foothills in extreme NW Afghanistan, Jurassic and Cretaceous sediments, mainly limestone with Palaeocene formations along the flanks.

iv. The Nuristan and Sulaiman mountains form part of the southern Hindu Kush branch and consist of a crystalline zone of gneisses, schists and granite intrusions with complicated magmatite zones and flanked by Palaeocene sediments.

v. Dasht-i-Margo is a synclinal basin filled with material eroded from the Hindu Kush. The deposits are mainly silt, clay and aeolian sands and the lowest dry areas are covered with salt.

vi. SW Afghanistan is part of the Makran range and consists of soft tertiary sandstone, shale and mudstone.

2.1.4 Soils

The soils of the lower-lying parts of Afghanistan are an association of shallow, stony soils (lithosols, regosols and yermosols), derived from tertiary limestones, marl, calcareous sandstone and shales and characterized by a very low rainfall. Poorly developed soils (cambisols) predominate in mountainous areas.

i. Mountain slopes are bare or carry lithosols. These are shallow, poor soils with little potential for agriculture. They are subject to wind and water erosion. They should be protected by closed vegetation.

ii. Lower mountain slopes have shallow regosols or gravelly yermosols with low moisture-holding capacity. They are unsuitable for agriculture and have suffered heavy erosion caused by overgrazing. The best land use is traditional rotational grazing. The loess soils, developed on aeolean deposits, are suitable for irrigated farming.

iii. Gently sloping parts of valleys have alluvial deposits or silty yermosols with a well developed horizon of accumulated clay. They suffer a lot of overgrazing. Without irrigation the best land use is rotational grazing on properly managed pastures. With irrigation they are very productive soils for fruit trees and wheat but are very susceptible to erosion.

iv. Alluvial soils along the rivers [illegible]. They are the most productive and intensively used soils of Afghanistan and are, with a sufficient water supply, excellent for agriculture.

v. Steppe areas in the north and west have yermosols associated with some lithosols. In the north they include some regosols. They are bare or support scanty vegetation. The best land use is rotational grazing.

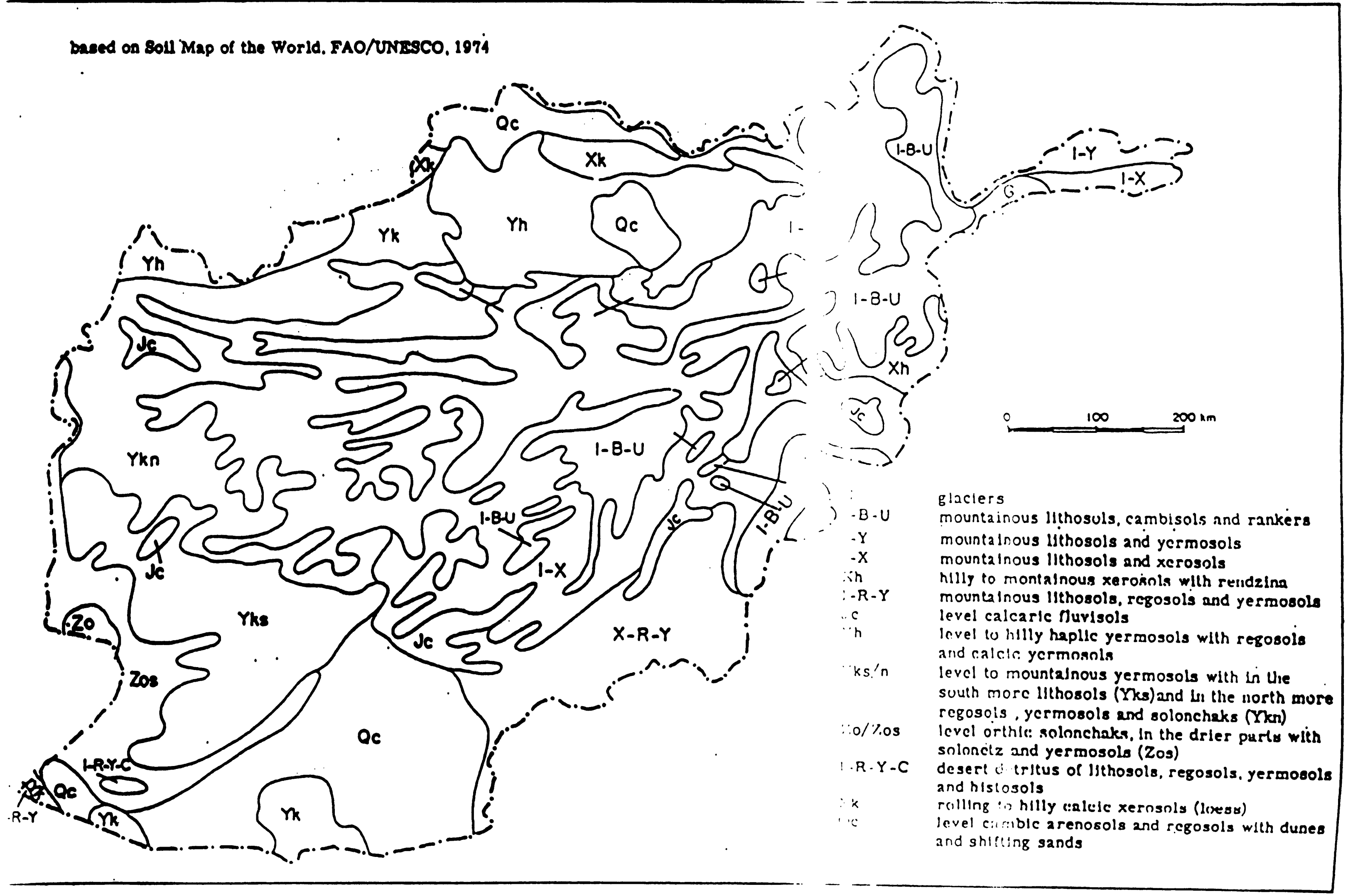
vi. Lower valleys of the Helmand and Farahrud rivers have playas with clayey soils with a high salt content (solonchaks), formed by evaporation of runoff water coming from the higher areas. They are poor, saline areas, bare or with halophytic vegetation. They are only suitable for low intensity grazing.

vii. Desert areas of Registan, to the SE of Mazar-i-Sharif and in the extreme north, have sandy soils (arenosols) associated with regosols. They have a low moisture and nutrient holding capacity and are subject to considerable erosion. Rotational grazing with use adjusted to the carrying capacity can improve productivity.

viii. Lower Kabul river and the area north of Mazar-i-Sharif have very dry and sandy soils (xerosols) normally used for poor crops of barley and wheat followed by a year fallow with grazing. Without irrigation crop production is very unreliable.

ix. Higher Hindu Kush and the Pamirs have mainly lithosols with little developed deeper soils on the low parts of slopes, on old river terraces and in lacustrine and loess deposits.

Map 6 **SOIL MAP OF AFGHANIST/ N**



2.2 BIOLOGICAL ENVIRONMENT

2.2.1 Biogeographical divisions of Afghanistan

Afghanistan belongs to the Palaearctic region; it is separated from the Oriental region by the Sulaiman mountains. Strong oriental influences are found in the lower Kabul valley. The following biogeographical provinces are recognized (see Map 7).

I Palaearctic Realm

a. Turanian Province
desert and steppe meadows of northern Afghanistan

b. Iranian Desert Province
Helmand Basin and Registan

c. Anatolian-Iranian Desert Province
southern steppe meadows

d. Hindu Kush Province

e. Pamir-Tien Shan Province
Pamir highlands

f. Himalayan Highlands Province
eastern mountains.

II Indomalayan Realm

a. Indus-Ganges Monsoon Forest Province
Lower Kabul Valley.

2.2.2 Vegetation

The vegetation throughout Afghanistan has been severely influenced by man (see Section 2.3). Only a few high mountain and extreme desert areas retain a natural vegetation cover. In the south the vegetation depends on the irregular winter rain. This rain increases to the north and east and makes richer vegetation possible.

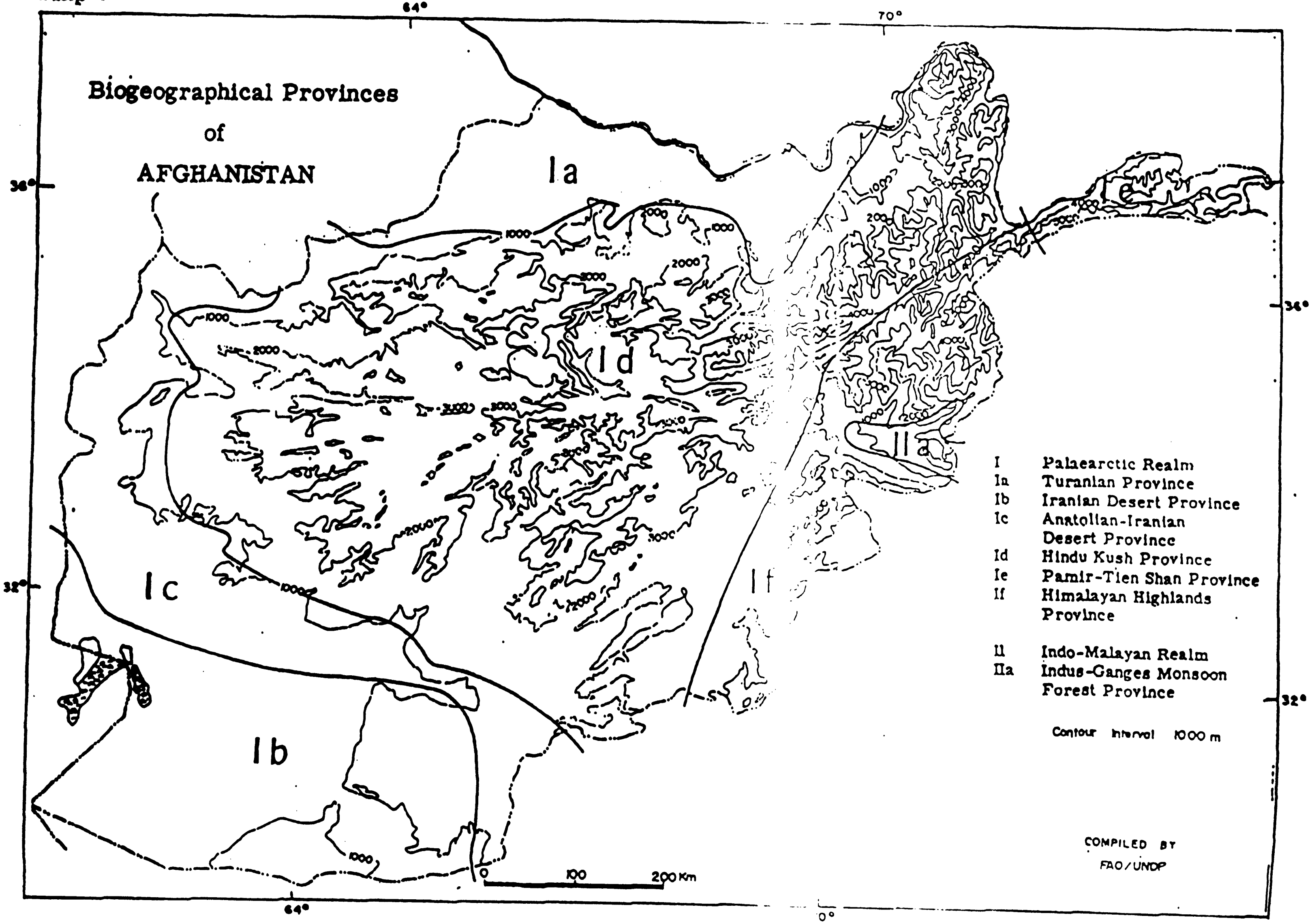
2.2.2.1 Desert vegetation

The deserts of northern and southern (Registan) Afghanistan contain active sand dune areas and dunes fixed by an open vegetation. The vegetation is scarcely modified by man. The main plants are Haloxylon persicum, Calligonum spp and perennial Aristida spp. In lower lying saline areas, Chenopodiaceae are dominant and in the saltplains of Seistan the very open vegetation is characterized by Haloxylon salicornicum, Salsola spp, Ephedra scoparia, Tamarix spp etc.

2.2.2.2 Steppe vegetation

The steppes are the most important grazing areas of the nomads. The low lying steppes in the west and south are dominated by an open vegetation of Artemisia herba-alba and other Artemisia species, Zygophyllum spp,

Map 7



Biogeographical Provinces
of
AFGHANISTAN
Ia
Ib
Ic
Id
Ie
If
IIa
64°
70°
36°
32°
I Palaearctic Realm
Ia Turanian Province
Ib Iranian Desert Province
Ic Anatolian-Iranian Desert Province
Id Hindu Kush Province
Ie Pamir-Tien Shan Province
If Himalayan Highlands Province
II Indo-Malayan Realm
IIa Indus-Ganges Monsoon Forest Province
Contour interval 1000 m
COMPILED BY
FAO/UNDP
0 100 200 Km

Acantholimon spp, Acanthophyllum spp, Atriplex spp, Alhagi camelorum, Cousinia spp, etc. Along dry riverbeds there are thorny belts of Stocksia brahuica, Amygdalis communis and Convolvulus spinosus. The floral composition is very variable and depends on humidity, length of winter, sand composition, wind force and grazing pressure. More humid places have denser vegetation with a richer species composition. In areas west of Herat with cold winters, Artemisia spp and Ferula spp (Apiaceae) dominate along with geophytes like Iris songarica and Allium spp.

The northern loess zone supports a grass steppe dominated by Poa bulbosa or Carex pachystylis with Bromus spp, Agropyron spp, Festuca spp, etc. Herbaceous bulbs such as Anemone, Gagea, Tulipa, Iris and Muscari are the first flowering plants in the spring. Shrubs are completely absent. In the spring the ground cover is 30-90%, but most of the plants die back from lack of water in the summer.

In the higher mountains there are areas of semi desert. Around Bamyan they are dominated by Salsola spp. High level steppes benefit from a higher precipation as well as lower evaporation. Overgrazing generally favours the less palatable Artemisia scrubs and annuals at the cost of the palatable perennials. In dry years when the annuals do not germinate, heavy mortality of domestic animals occurs.

2.2.2.3 Riverbeds and lakes

The original forests of the major river valleys have been replaced by irrigated croplands.

Tugai vegetation is found in regularly flooded areas. This is dominated by Tamarix spp, willows (Salix spp) and reeds (Phragmites australis) and, depending on the frequency of inundation, species such as Populus spp, Myricaria spp, Berberis spp, Crataegus spp and Hippophaea spp. Herbaceous plants are well represented.

Along the river beds on well drained areas with deep soils, many of the wild ancestors of cultivated fruit trees occur. These include the apple (Pomus spp), pear (Pyrus spp) and almond (Amygdalis spp). Fraxinus spp, Acer spp and Plantanus spp also occur.

Hardly any information is available on the vegetation of the lakes but Hamun-i-Puzak and Kole Hashmat Khan are covered with reeds (Phragmites australis). The only higher plant in the Ab-i-Estada lake is the pondweed (Ruppia maritima) and some Characeae occur in Dashte Nawar.

2.2.2.4 Amygdalis scrublands

Amygdalis scrublands are intermediate between the steppes of the south and west and the woodlands of the Hindu Kush. These areas are important for winter pasture. An Amygdalis brahuica community is found between 1 000 and 2 000 m altitude in the dry valleys of the east.

2.2.2.5 Pistacia and Juniperus woodland

On the higher slopes of the Hindu Kush open Pistacia woodlands replace the Amygdalis community. These woodlands are heavily used and badly degraded. The southern slopes of the Hindu Kush are characterized by 4-6 m high Pistacia atlantica and are rich in herbs like Gagea, Anemone and

- Give reseeding of rangelands with shrubs and grasses priority over the planting of trees.

- Collect information on nomadic and semi-nomadic people, especially on their numbers, migration, livestock and socio-economic structure.

- Limit total numbers of livestock. This will release pressure on rangeland, and avoid starvation and heavy loss of livestock in dry years.

- Increase the output of animal products such as meat, milk, wool and skins and improve quality and marketing facilities.

- The veterinary department should give emphasis to control of chronic debilitating diseases which affect productivity.

- Educate all levels of the population in rangeland management practices.

- Stimulate the use of solar energy and micro-hydroelectricity and discourage the use of range plants for fuel.

B. CONSERVATION OF FORESTS

Once forests covered a large part of Afghanistan, but they are being destroyed by over cutting. Seventy percent of the timber felled is wasted and much is illegally exported. Large quantities are used for fuelwood and charcoal.

<u>Recommendations</u>

- Determine the extent of the remaining forest land and establish strategically placed forest reserves to maintain seed stock.

- Make a further attempt at a demonstration project on forest management practices in Paktia and Kunar. Support this with sociological studies. Conserve and manage the Pistacchio forest in Badghis.

- Restrict use of fuelwood in the larger towns and encourage the use of alternative fuels such as coal, gas and electricity.

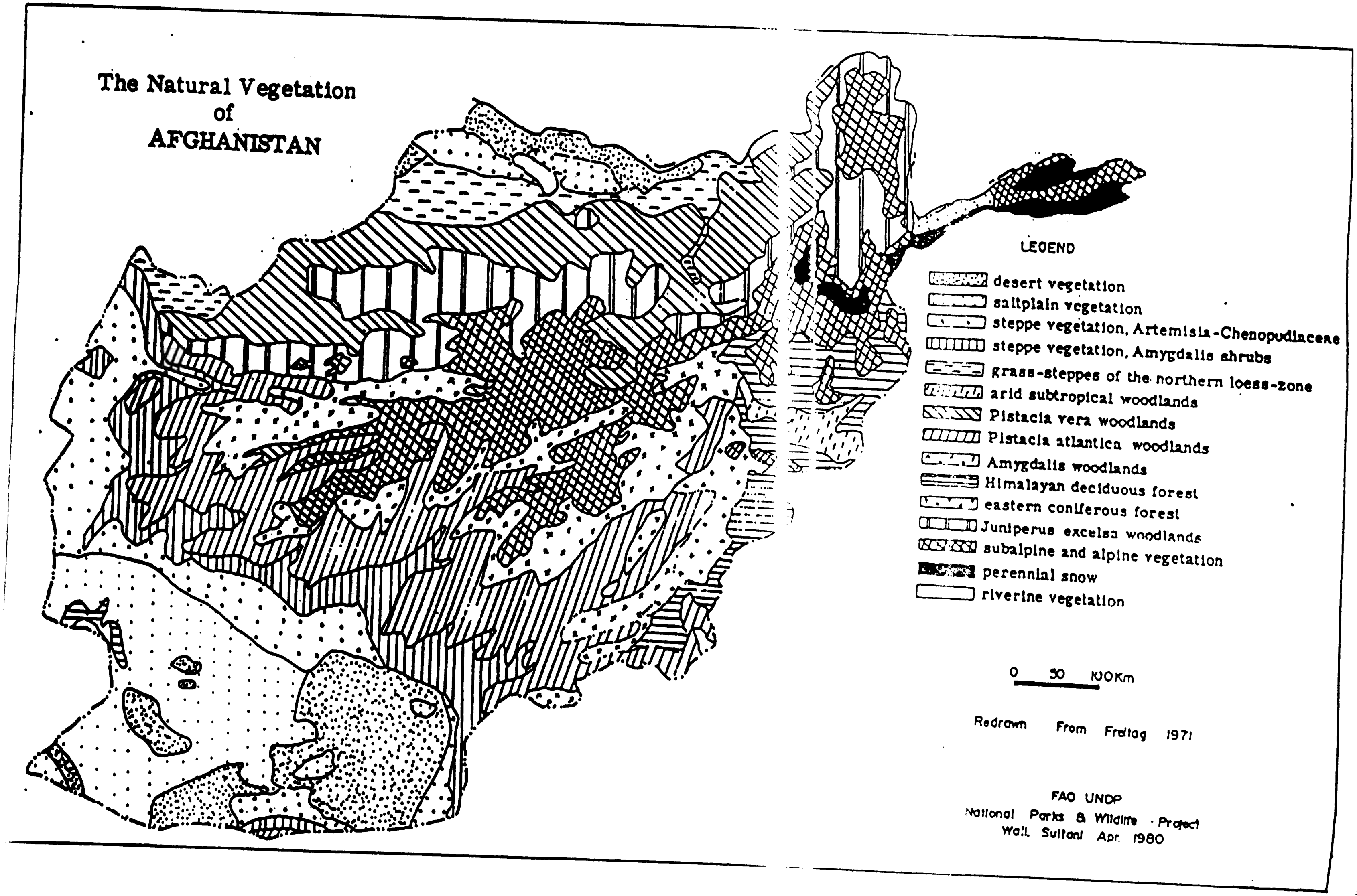
- Whenever possible village woodlots should be established.

- Develop more efficient wood burning stoves.

C. CONSERVATION OF WETLANDS

Afghanistan's wetlands, especially Ab-i-Estada and Hamun-i-Pujak, are of outstanding biological interest, especially for waterbirds. Most are saline through evaporation. Their existence is often threatened by upstream irrigation projects.

Map 8


The Natural Vegetation
of
AFGHANISTAN
LEGEND
desert vegetation
saltplain vegetation
steppe vegetation, Artemisia-Chenopodiaceae
steppe vegetation, Amygdalis shrubs
grass-steppes of the northern loess-zone
arid subtropical woodlands
Pistacia vera woodlands
Pistacia atlantica woodlands
Amygdalis woodlands
Himalayan deciduous forest
eastern coniferous forest
Juniperus excelsa woodlands
subalpine and alpine vegetation
perennial snow
riverine vegetation
0 50 100Km
Redrawn From Freitag 1971
FAO UNDP
National Parks & Wildlife · Project
Wali Sultani Apr. 1980

Allium spp. Pistacia khinjuk and Cercis griffithii are found in the Kabul/ Logar valley. Above this zone, between 2 000 and 3 000 m and in areas with more than 400 mm of precipitation a 2.5-6 m high Amygdalis community is dominant; many scrub species and geophytes such as Eremurus, Corydalis, Gagea, Tulipa, Allium spp also occur.

To the north of the Hindu Kush on the extensive loess plains between 600 and 1 600 m woodlands of Pistacia vera with some Amygdalis bucharica and in the northeast Cercis griffithii are characteristic. The upper part of the forest belt on the northern slopes of the Hindu Kush is formed by an open mixed woodland dominated by Juniperus excelsa. The Pistacia vera and Juniperus excelsa woodlands are heavily exploited for charcoal production.

2.2.2.6 Arid sub-tropical woodland

Perennial grasses and thorny evergreen shrubs and small trees predominate in the lower Kabul Valley, which experiences hot summers and moderate winters. Heavy grazing and fuelwood collection have reduced the shrubs and led to an increase of annuals. A Zizyphus nummularia community occupies the lower regions (up to 750 m). This is replaced at higher levels with a Salvia-Pistacia community. In the dry higher valleys Acacia modesta penetrates the vegetation. Between 750 and 1 500 m there is sometimes a 25 m high Reptonia buxifolia and Olea ferruginea woodland which is heavily utilized for fodder and as pasture land.

2.2.2.7 Himalayan deciduous forest

Between 1 200 and 2 000 m the oak Quercus baloot dominates a forest which is up to 15 m high; it has a rich undergrowth and several tree species including almonds (Amygdalis kuramica)and pistachios (P. khinjuk). It is heavily utilized for fodder, fruits and fuelwood and large parts have been destroyed to provide fuel for Kabul and Kandahar. The Q. baloot forest in the Pansjir valley northeast of Kabul forms the westernmost extension of the Himalayan forest belt.

In very humid places with high summer rainfall Q. baloot is replaced by Q. dilatata and between 2 400 m and 2 900 m by Q. semecarpifolia associated with Juglans regia, Acer turkestanicum and Pyrus pashia.

2.2.2.8 Temperate coniferous forests of east Afghanistan

The forest belt between 2 200 and 2 500 m is a 5-12 m high Pinus gerardiana woodland with local stands of Betula. A thorny Cotoneaster - Sophora - Rosa scrubland colonizes the areas after the pine has been felled.

Between 2 500 and 3 100 m Cedrus deodora forest is found. Depending on soil and humidity the cedars may be up to 50 m high and form a very dense forest. Large parts of the Cedrus forest have been exploited and replaced by a stable Artemisia community. Logging has now reached even the western parts of Nuristan.

In the humid areas the upper belt of the forest, up to an altitude of 3 300 m, is formed by a 20-25 m high Picea smithiana - Abies webbiana forest and in the dry areas by a 10 m high Juniperus seravschanica-

J. semiglobosa woodland. However most areas have been cut for fuelwood and mature stands are rare. The herbaceous ground cover, especially along the streams, is heavily overgrazed.

2.2.2.9 Subalpine vegetation

In areas in the east with summer rains a dense 0.5-1 m high vegetation of Juniperus squamata, Rosa spp, Ribes spp and Rhododendron spp develops above 3 300 m. On deep soils, Salix spp may dominate this community.

In the Hindu Kush, a Juniperus nana community with many thorny dwarf shrubs occurs. Between 3 600 and 4 000 m in the central and northern Hindu Kush, there is a cushion scrubland with species of Acantholimon, Artemisia, Astragalus, Cousinia, Ephedra and Onobrychis as sub-dominants. Many endemics occur in this area.

2.2.2.10 Alpine and nivale vegetation

The alpine vegetation of the Hindu Kush is open and poor in species. That of the Pamirs is denser with a greater variety of herbs. Usually, the alpine meadows, dominated by grasses and a variety of herbs, are heavily utilized during two months as summer pastures by the nomads. In the Pamirs, the boundary with the nivale zone is 4 900 m on the northern exposed slopes and 5 300-5 400 m on the southern exposed slopes. The higher peaks and [illegible] by alpine heaths (Ericaceae) and low frost resistant herbaceous and wood vegetation. The highest record of a vascular plant in Afghanistan is the beautiful Primula macrophylla in the central Hindu Kush at 5 450 m. No seed plants occur in the nivale zone. Some ferns and mosses occur up to 5 630 m in the Issik Valley in the Pamirs.

2.2.3 Fauna

The Afghan fauna is characterized by many animals adapted to arid steppe or mountain conditions. Man has strongly influenced the fauna, both directly by hunting and indirectly by changing its habitat by grazing livestock, burning and fuel collection.

The large herds of wild asses (Equus hemionus) and gazelles (Gazella spp), which until recent times populated the steppes, have been almost exterminated by hunting. Similarly their predators, the cheetah (Acinonyx jubatus) and to a lesser extent the hyaena (Hyaena hyaena), have declined. Their associated arthropod fauna, such as the dung beetles (Scarabaeidae), which are often rather host specific, have also presumably disappeared. The forests and mountains also harboured large numbers of wild goat (Capra aegagrus), urial (Ovis orientalis), ibex (Capra ibex), markhor (Capra falconeri) and Bactrian deer (Cervus elaphus bactrianus). These also have been much reduced by hunting and habitat degradation. Predators which are sought after for their furs, such as the Turanian tiger (Panthera tigris virgata) (probably extinct in Afghanistan), the snow leopard (Panthera uncia), the leopard (Panthera pardus) and the wolf (Canis lupus) are now very rare. Only relatively protected or isolated areas, such as the Pamir with its famous Marco Polo sheep (Ovis ammon poloi), have kept their fauna.

Afghanistan lies on the major migration routes of many birds including the rare Siberian crane (Grus leucogeranus), many ducks (Anatidae), waders and birds of prey. For these birds, the Afghan wetlands are an essential stop for resting and feeding during their migrations. Many birds also over winter in these wetlands.

Fishes and amphibians are scarce in such an arid country. Trout are however found in many mountain streams. Reptiles are abundant. The insect fauna is poor in species but certain pest species, such as the desert locust, may be quite numerous at times.

2.2.3.1 Mammals

The wild sheep (*Ovis orientalis*) and goats (*Capra aegagrus*) are amongst the most important members of the Afghan fauna. They are the wild ancestors of all domestic sheep and goats and as such they and their close relatives are potentially valuable sources of genetic material for the improvement of domestic varieties. They form a complex group taxonomically as they inter-breed but tend to exist in fragmented populations, which are morphologically distinct from nearby populations. Some recent taxonomists link the forms represented in Afghanistan to three species: the sheep (*Ovis ammon*), the goats (*Capra aegagrus*) and the markhor (*C. falconeri*). Many authors however describe five species for Afghanistan:

1.	*Capra aegagrus blythi*	wild goat
2.	*Capra ibex sibericus*	Siberian ibex
[illegible]	[illegible]	[illegible] (Kunar and Laghman)
	C. falconeri megaceros	Kabul markhor (Panjshir valley, between Kabul and Jalalabad)
	C. falconeri heptneri	Badakhshan markhor (Takhar and Darwaz)
	C. falconeri jerdoni	straight-horned markhor (Paktia Province)
4.	*Ovis ammon poloi*	Marco Polo sheep
5.	*Ovis orientalis vignei*	urial

There are hearsay reports from Nangarhar and Kunar of an animal which fits the description of the grey goral (*Nemorhaedus goral*). This species occurs in identical habitat in contiguous parts of Pakistan. The blue sheep (*Pseudois nayaur*) occurs in the high mountains of Hunza district, Pakistan, bordering the Pamir, in the same general area as that to which Marco Polo sheep migrate in the winter. It may have crossed into Afghanistan in the past.

The goitered gazelle (*Gazella subgutturosa*) still occur in the steppes in the west and south. Common gazelles (*Gazella dorcas*) have never been recorded in Afghanistan but their occurrence in Iranian and Pakistan Baluchistan makes it very likely that they also occur in Afghanistan. The goitered gazelle is a herd animal of the open plains. The common gazelle is less gregarious and inhabits broken hilly country.

The wild boar (*Sus scrofa cristata*) is common in riverine tracts and is often an agricultural pest. Bactrian deer (*Cervus elaphus bactrianus*) are extremely rare and restricted to the area of Darqad along the Amu Darya river and to the Ajar Valley reserve in Bamian Province. Musk deer (*Moschus moschiferus*) have been reported from [illegible]

Wild ass (Equus hemionus kulan) probably migrate in small numbers from the Soviet Union into northwest Afghanistan. Most of the carnivores are heavily hunted for their pelts or in the case of the larger species persecuted because they kill domestic animals. The hyaena (Hyaena hyaena) and wolf (Canis lupus) still occur in reasonable numbers but the big cats like the cheetah (Acinonyx jubatus), the caracal lynx (Felis caracal) and the Turanian tiger (Pantera tigris virgata) are probably extinct. The leopard (Panthera pardus) still occurs in most of the mountain ranges. The lynx (Felis lynx), snow leopard (Panthera uncia) and brown bear (Ursus arctos) occur in the alpine areas of the Pamirs and Hindu Kush. The Atlantic black bear (Selenarctos thibetanus) has been recently discovered in the Nuristan forests. The only wild primate occurring in Afghanistan is the rhesus macaque (Macaca mulatta). The macaque is an oriental species and lives in the moist temperate forests of Nuristan and Laghman. Two other conspicuous representatives of the oriental region which live there are the giant flying squirrel (Petaurista petaurista) and the smaller Kashmir flying squirrel (Hylopetes fimbriatus).

A large number of rodents occur in Afghanistan. Many are pests of cultivation, such as mice and rats, or forest dwellers, like the flying squirrels. Others are typically associated with the arid steppes and mountain plains. The jerboas (Dipodidae) have adapted to the arid conditions by a saltatorial mode of [illegible] (jumping) and have greatly elongated hindlegs. The Gerbillinae (gerbils, sand rats, jirds, etc.) are adapted to the semi-arid steppes, the hamsters and voles to the more rocky habitats. The long-tailed marmot (Marmota caudata) is common in the higher mountains and much sought after for its meat and pelt. Many carnivores, such as cats (Felis spp), mongooses (Herpestes spp), hedgehogs (Hemiechinus and Paraechinus), foxes (Vulpes spp) and others, prey upon these rodents and are richly represented in species and numbers in Afghanistan.

2.2.3.2 Birds

In the migration seasons huge numbers of birds migrate from Siberia through Afghanistan to the warmer Indian peninsula and Africa. Small passerines, such as chiffchaffs (Phylloscopus collybita), lesser white-throats (Sylvia curruca), and other warblers (Acrocephalus spp) and bluethroats (Luscinia svecica) can be seen everywhere in the town gardens, villages and oases. During these seasons the wetlands throughout the country serve as essential resting places for the thousands of waders, ducks and other waterfowl. The rare Siberian crane (Grus leucogeranus) stops at Ab-i-Estada on its way to India from its breeding areas in the Soviet Union. Colonies of greater flamingos (Phoenicopterus ruber) breed here and at Dashte Nawar.

The lower Kabul valley in eastern Afghanistan is a wintering area for many birds. Hoopoes (Upupa epops), swallows (Hirundo rustica) and house sparrows (Passer domesticus) remain there throughout the winter, whereas elsewhere in Afghanistan they are summer visitors.

A variety of species are especially adapted to arid conditions. Sand-grouse (Pterocles spp), particularly the imperial sandgrouse (P. orientalis) are locally very common. Desert finch larks (Ammomanes deserti), desert larks (Alaemon alaudipes), desert finches (Rhodopechys spp) and several wheatear species (Oenanthe spp) are all widespread. The Houbara bustard (Chlamydotis undulata) is quite common and the great bustard (Otis tarda) regularly visits the northern steppes.

Birds of prey and vultures are numerous, especially on migration, but the black kite (*Milvus migrans*) and kestrel (*Falco tinnunculus*) are common throughout the year. The Egyptian vulture (*Neophron peronopterus*) is common everywhere and the bearded vulture (*Gypaetus barbatus*) occurs in most of the mountain ranges. Other typical mountain birds are the snowcocks (*Tetraogallus himalayensis*), chukur (*Alectoris chukar*), mountain finches (*Leucosticte* spp), wall creepers (*Certhia himalayana*), choughs (*Pyrrhocora* spp) and snowfinches (*Montifringilla* spp). Theresa's snowfinch (*M. theresae*) is the only bird endemic to Afghanistan, although it migrates in winter to Soviet Transcaspia.

Several species typical of the Himalayan forests penetrate Nuristan. These include the rare monal pheasant (*Lophophorus impejanus*), the koklaas pheasant (*Pucrasia macrolopha*), woodpeckers (*Dendrocopus* spp) and parakeets (*Psittacula himalayensis*). Other representatives of the oriental fauna which penetrate the Kabul valley are the shrikes (*Lanius vittatus* and *L. schach*), common myna (*Sturnus tristis*), brahminy myna (*S. pagodarum*), drongos (*Dicrurus* spp) and bulbuls (*Pycnonotus* spp).

The pheasant (*Phasianus colchicus*) was formerly common in the northern valleys of the Amu Darya, Murghab and Hari Rud rivers; it is believed to have decreased greatly as a result of overhunting in recent years.

Reptiles and amphibians

Reptiles are important members of the fauna of the arid steppes. A large variety of species occurs. Several genera of lizards are predominantly represented in the arid regions such as the agamids (*Agama*), the toad-headed lizards (*Phrynocephalus*), the spiny-tailed lizards (*Uromastyx*), sand skinks (*Ophiomurus*) and monitor lizards (*Varanus*). The Bengal monitor (*V. bengalensis*) is frequent in the Kabul valley and the desert monitor (*V. griseus caspius*) occurs in the steppes of the Helmand basin and in the north. Like many other desert animals it spends the hot part of the day in holes.

Several snakes, including some very poisonous ones, inhabit the steppes. The sandboas (*Eryx* spp) live most of the time beneath the surface. The saw-scale viper (*Echis carinatus*) is particularly aggressive and venomous. It progresses by a side-winding movement in the loose sand. The Central Asian cobra (*Naja oxiana*) occurs in the scrub and open woodlands on the northern slopes of the Kohe Beni in Herat province. In an optimal habitat it exists at a density of one snake to 1.5 ha.

The common tortoise in Afghanistan, the Afghan tortoise (*Testuda horsfieldii*) is the easternmost representative of its genus; it is locally abundant in grassy places near springs or streams in rocky terrain, up to an elevation of 2 500 m. It is only active for a few months, eating mostly flowers. During periods of extreme cold and heat it shelters in tunnels.

The amphibians, as would be expected, are not richly represented in Afghanistan. The only salamander species, the endemic *Batrachuperus mustersi*, is found in the mountain streams of the Paghman range. Its closest relatives are found in the Chinese mountains. Five species of frogs and toads (*Rana* and *Bufo*) have been recorded. Four endemic species of reptiles are recognized from Afghanistan. Further research may well lead to the discovery of others.

2.3 ECOLOGICAL HISTORY

2.3.1 Prehistoric times

At the peak of the last glacial advance of the Pleistocene (ca. 20 000 B.C.) much of Afghanistan north of the main ranges of the Hindu Kush was covered with ice. The rest of the country experienced a very cold climate and was more arid than it has been during the recent post glacial period. It seems likely that the absence of extensive glaciations in the central highlands and plateaux was due to inadequate precipitation. At this time tundra conditions would have existed over most of the rest of the country. One could speculate that woodlands might have persisted in the extreme south and east where the effects of monsoonal rainfall from the Indian ocean might have been felt.

The present day climax vegetation would be that which would have evolved since the glacial recession (10 000 B.C.) in the absence of human influence. This influence has never been entirely absent and it is questionable whether a true climax vegetation has ever existed in Afghanistan outside of those very arid or high alpine zones where people rarely venture. The exact extent of human influence in the early post glacial is not known; there appear to be no studies of the historical demography of Afghanistan. Work in Iran (Flannery, 1968) suggests that in similar environments in that country the pre-agricultural population would have been between 0.1 and 0.5 persons per square kilometre. These hunter-gatherer peoples, aggregated into rather small communities, would have had very little impact on the development of post-glacial plant communities. Dry farming began to be practised about 9000 B.C. and during the next 2 000-3 000 years the human population might have grown to 1 or 2 per square kilometre in suitable areas. Larger communities would have existed and increasing use have been made of wood for fuel. It is still unlikely that these people would have drastically affected the vegetation cover outside the immediate vicinity of their settlements.

Irrigation was first practised between 5 000 and 6 000 years ago and a rapid increase in the population occurred at that time. Population densities may have reached 5-7 persons per square kilometre but such concentrations were confined to areas suitable for irrigation using the primitive techniques then available. In the areas concerned, principally along rivers, the human population would have seriously modified the vegetationbut vast areas of the country where irrigation was not practised must have been little influenced by man.

2.3.2 Improvement of irrigation and agriculture

This brings us into the historical period when we must assume that the population increased rather erratically to its present level of about 14.5 million (22.2 per km^2). There would have been a background of continuous growth resulting from improvements in agriculture and the extension of irrigation. Superimposed upon this would have been sudden increases following migrations into the country and during periods of rigidly enforced government which would have been conducive to the construction and maintenance of effective irrigation works. These would have been offset by dramatic declines [illegible]

the destruction of irrigation works and the famines that would have resulted. The most notable example is that of the destruction wrought by the Mongol hordes of Genghis Khan 700 years ago.

2.3.3 Population increase in the last century

We can get an indication of the population density in the more recent past by extrapolating backwards from knowledge of the present day population and its growth rate. The 2.2% growth rate given by the World Bank (1978) would imply that the population has quadrupled in the past 100 years. Some demographers on the 1979 UN population census project feel that this rate is far too high but even so it is probable that the population in the mid 19th century was very much lower than it is today. We have historical accounts of extensive forests in the region of Kabul at this time and even today relict patches of woodland exist at Istalif and Charikar just north of Kabul. Our conclusion is therefore that most of north, central and eastern Afghanistan was wooded until early in the last century. Certain areas where dense concentrations of people have lived for a very long time may have been stripped of their forest in prehistoric times or may never have developed wooded vegetation in post-glacial times. Of these areas the [illegible] the very old and elaborate irrigated areas on the Farah Rud and Helmand [illegible] did exist have been destroyed by overgrazing and cutting in the recent past. One caveat should be attached to these conclusions. This concerns the nomads. These people own most of the livestock in the country and their impact on the environment is great in relation to their numbers (ca. 2 million). Almost nothing is known of the demography of the nomads and it is possible that historically they constituted a rather higher proportion of the total population than at present. However, this would not affect the basic conclusions; it would only mean that the putative dates for the destruction of the forests would have to be revised backwards.

2.3.4 Impact of ungulates

Some demographers and archaeologists would argue that man's impact on the early post-glacial vegetation succession was much greater. It is also possible that physical barriers such as the main range of the Hindu Kush could have prevented trees from colonizing some areas. A further problem arises from our almost total ignorance of the abundance and impact of wild ungulates and subsequently their domestic derivatives. Wild sheep (*Ovis ammon* and *O. orientalis*), goats (*Capra ibex* and *C. aegagrus*), gazelles (*Gazella subgutturosa* and *G. dorcas*), onagers (*Equus hemiones*), deer (*Cervus elaphus*, *Moschus moschiferus*) and possibly other grazing animals will have comprised the climax fauna in the immediate post-glacial era. Their selective feeding will have influenced the evolution of the flora. The population of these wild species will have decreased in inverse relation to increases in the numbers of man and his domestic animals, the latter beginning to be a significant factor in the area from about 7000 B.C. onwards.

A great deal of research remains to be done on the vegetation history of Afghanistan; all that can now be said with certainty is that over large areas of the country the present climate can support trees and there is evidence that woodlands were much more widespread in the fairly recent past. The exceptions are the arid areas in the north, west and south and the high

alpine areas in the centre and northeast. These areas could never have supported tree growth. The remaining categories are those areas which could support trees but which have not done so in the post-glacial period because human presence was always too intense to allow colonization. It is the extent of these last areas that is the largest imponderable.

2.3.5 Present forest use

Forest destruction is continuing today at a faster rate than ever before. Most of the rural population and even that of quite large towns such as Bamyan still depend upon shrubs and dried herbs for fuel. Everything that burns is gathered; *Artemisia* and *Haloxylon ammodendron* and even the camelthorn (*Alhagi sparsifolium*) are common fuel in the lowland steppes while in the alpine areas *Cousinia* spp and *Acantholimon* spp are burnt.

The few remaining forest areas of the country are being destroyed at an alarming rate to meet the fuel needs of the major cities. Large-scale charcoal production has destroyed the extensive *Juniperus* woodlands of north Afghanistan. At present fuel for Herat comes from the *Pistacia* - *Amygdalis* forests of Dari Wakhal and the mountains north of [illegible]; the *Quercus baloot* and conifer forests of Paktia province are exploited to provide fuel for Kandahar and Kabul and the Jalalabad basin; particularly the Kunar area is heavily exploited for fuel for Jalalabad and Kabul. According to a World Bank report (1978) ten times the sustainable yield of timber is extracted from these areas each year. Ironically Babur, writing in the 17th century, commented that even the hills immediately around Kabul provided plenty of firewood. He specifically mentions *Pistacia* spp, *Amygdalis* spp, *Quercus baloot* and *Acantholimon* spp. Extensive areas of *Quercus baloot* and *Cercis griffithii* still persisted within living memory but the stands which still remain are near Istalif and Charikar and are much degraded. The Forestry Department recorded 100 truck loads of firewood per day arriving in Kabul in the winter of 1978/79.

Over much of Afghanistan the destruction of the vegetation for fuel is of less importance but supplements the destruction caused by grazing and browsing by domestic stock. The problems of protection and use of rangelands will be dealt with in a subsequent section but it is important to our present arguments to mention that the predominance of poisonous and thorny shrubs and herbs, such as *Eremurus* spp and various Euphorbiacae, and the high ratio of annual plants to perennials, are quite unnatural and result from a long history of overgrazing.

This lengthy discussion of vegetation changes in the post-glacial period is necessary in helping us to determine what the climax vegetation of different parts of Afghanistan would be. Such knowledge is important as the objective of management of most protected areas should be to create conditions in which the vegetation will develop towards a climatic climax. In addition since climax vegetation is that which is best adapted to, and probably most productive and stable in, a given environment, knowledge of what the climax vegetation cover would be can be useful in improving the yield from managed pastures and forests.

2.3.6 Original climax vegetation

Insufficient knowledge exists for us to say much about the climax floristic composition of primary steppe and high alpine areas. In the former perennial grasses and palatable herbs and shrubs have become rare or extinct at the expense of taxa which are highly adapted to withstand grazing. Sheep and goats graze at very high altitudes so much the same is probably true of alpine areas. Only the very high nival zone where few phanerogamic plants occur is probably totally unmodified by man and livestock.

Charcoal remains from an archaeological site near Kandahar show that Juniperus spp, Prunus spp, Pistacia kabulica and possibly Celtis spp were used as fuel 3 000 years ago (Willcox, personal communication). In an isolated gorge near Shah Maksud, north of Kandahar, Willcox found a patch of relict woodland containing Pistacia kabulica, Celtis caucasia, two species of Prunus, Colutea spp, Salix spp, Fraxinus xanthoxyloides, Rosa spp, Juniperus spp and Ampelopsis vitifolia. The implication is that a mixed woodland containing these and probably several other tree species was widespread in the hot dry medium altitude steppes of the southwest of the country. A 2 200 year old archaeological site at Ai Khanum in Talogan province in the [illegible] Crataegus spp, Celtis spp and/or Ulmus spp, Eleagnus angustifolia, Tamarix spp, Platanus orientalis and Salix spp. The only species at present growing in the locality is Pistacia vera but relict woodland patches containing the others exist nearby. This list suggests the tree species which might have been widespread in the wetter, colder steppes of the north and centre of the country.

In the central highlands Juniperus spp still occur quite widely and must have been one of the dominant tree species up to an altitude of about 3 000 m. At lower altitudes Cercis griffithii, Quercus baloot (restricted to the eastern part of this area), Acer semenovii, Crataegus spp and Pistacia spp would have been represented. In the valley bottoms Salix spp, Hippophae spp and Tamarix spp probably formed extensive thickets. In the monsoonal areas of eastern Afghanistan conditions are more favourable to tree growth due to the summer rains and quite extensive forests still survive. Although the vegetation has been modified considerably by man, parts of the remaining forests still show us clearly the climax types (see Section 2.2.2.8).

Recommendations

- Consider wetlands conservation in the planning phase of irrigation projects.

- Survey river courses, lakes and marshes and identify those areas that need protection. Station guards in these wetlands.

- Encourage research on the ecology and hydrological regimes of the wetlands.

- Artificial lakes are not of great ecological importance and should be used for recreation.

D. FARMLANDS IN ARID REGIONS AND WATERSHEDS

Dryland farming in arid regions often leads to soil exhaustion and erosion and people have to abandon the area. Natural restoration of the range is rarely possible. Irrigation projects and the opening of wells often have considerable ecological impact. Over-grazing and erosion seriously damage dam projects. There is no specific body for watershed [illegible]

Recommendations

- Restrict dry land cultivation in marginal areas.

- Environmental impact studies should be an important part of the planning phase of irrigation projects.

- Establish a watershed management authority, initially within the Department of Forest and Range.

- Protect and maintain or improve the vegetation cover of the catchment areas of dams.

E. CONSERVATION OF GENETIC RESOURCES AND SPECIES

Afghanistan has many species of wild animals and plants which are relatives of domestic species of economic value. Others are rare or have economic value as a tourist spectacle or for their furs. Many of these species are endangered by heavy pressure on their habitat or by excessive hunting.

Recommendations

- Establish a series of protected natural areas to safeguard the habitats of the animals and plants and set up pilot management programmes in Ab-i-Estada, the Ajar valley and at Kole Hashmat Khan.

3. CONSERVATION NEEDS AND PRIORITIES

3.1 FARMLAND

3.1.1 Traditional farming

Traditional farming is designed to make the most efficient use of the limited water supply, it is highly labour intensive and still uses little advanced technology. The dense network of irrigation channels and the mixture of annual crops and trees conserves water and soil and results in the creation of a very pleasing artificial landscape. Except that it eliminates the natural ecosystems of the area that it occupies, traditional Afghan agriculture is a form of land use which is very satisfying to the conservationist.

[illegible] problems. Dry land farming, especially on marginal or steep slopes, very often causes extreme erosion; the top soil is destroyed and the land then abandoned. The excessive use of diesel pumps to extract mildly saline groundwater for irrigation in the region of Lake Ab-i-Estada in Ghazni province has resulted in the creation of a landscape of fields abandoned when their soils became too saline to support crops and now colonized by unproductive halophytic forbs and shrubs. Many other examples could doubtless be found.

3.1.2 Large-scale irrigation projects

The last three decades have seen much of the country's development budget channelled into large-scale industrial agricultural projects using irrigation water derived from the major rivers. It has not been possible to visit the areas concerned and little has been written about the environmental impacts of these activities. Salinization has apparently occurred in some areas but the most serious environmental problem has resulted from some of the country's major wetlands being deprived of water. In the case of the Farah Rud, the irrigation schemes have had international repercussions in that they have deprived the wetlands of the Iranian Seistan of their principal water source. A similar problem may exist in Ghazni province where the Sardy dam and irrigation complex has reduced the flow of water into lake Ab-i-Estada. In Afghanistan's arid environment, the few existing wetlands are of enormous value. It is likely that future agricultural development efforts will be increasingly orientated towards large-scale irrigation schemes and the country's wetlands will be further threatened. It is expected that increased agricultural production will come from increased irrigation of land at present dry farmed rather than from an increase in the acreage cultivated. Such a development pattern while posing a threat to wetlands is environmentally sound in that it does not reduce the amount of uncommitted land. In economic terms the major investments made in the past in irrigation projects have yielded disappointing results. Quick returns through increased crop production [illegible]

to make efficient use of the land made available. The serious salinity problem, which has already appeared in large areas brought under irrigation, bodes ill for the future of the larger schemes.

3.2 RANGELANDS

Rangelands are of vital importance for Afghanistan's two million nomads. The rangelands are also essential for a large part of the settled population who derive their income from animal rearing and employment in the livestock industry. In view of the importance of these areas, it is astonishing that so little is known about their ecology or productive potential. The proportion of the domestic and international aid effort dedicated to range studies or management is very small. The few specialists who have knowledge of range conditions in Afghanistan are unanimous in their opinion that present mismanagement, and especially overgrazing, is causing a deterioration in range conditions and therefore in productive potential. Opinions vary on the extent to which this deterioration may be irreversible.

[illegible] winter (16 210 000 ha); the spring and autumn (16 030 000 ha) and the summer (22 460 000 ha) pastures. The relatively small extent of the Artemisia steppes which provide winter pasture in the south and west limits the number of livestock. These areas are very sensitive to overgrazing. The Soviet border prevents the nomads reaching large parts of their traditional winter range.

The basic problem is that maximization of livestock numbers has long been the main objective of herdsmen. This strategy has been adopted throughout the world by pastoralists as an insurance against the natural disasters of drought, starvation and disease. Such a strategy may have been appropriate in the past when human populations were sparse and the cash economy, communications and food transport were inadequate to protect them in times of hardship. In modern conditions, with sophisticated disease control programmes, the ability to transport livestock and water in times of drought and the possibility of readily transforming surplus stock to cash, a policy of maximizing stock numbers makes no sense. It is therefore ironic, but understandable in the sociological and political context of the pastoralist, that government involvement in the livestock and range sector is largely aimed at assisting stock owners in their aspiration to maximize animal numbers.

The most compelling evidence for the disequilibrium between stock and pasture comes from the pattern of fluctuations of livestock numbers. The population, especially sheep, tends to increase rapidly in years of average or above average rainfall. Then, when the inevitable dry years come, the numbers fall dramatically. This happened last in 1972/73 when 40% of the sheep did not survive the winter. The sheep population is now approaching a maximum and heavy mortality will occur in the next year when rainfall is significantly below average. Since the long-term tendency is for range condition to deteriorate, successive drops in livestock numbers may be expected to be more and more severe.

3.2.1 Present grazing policy

The Veterinary Services Department considers that the carrying capacity in the Afghan context is that number of animals which can be brought through the winter with a loss of no more than 10% body weight. This implies that winter grazing is at present the factor limiting stock numbers. It also suggests that there is a relative superabundance of summer grazing. This is not, however, the whole story as winter survival and weight loss are influenced by the condition of animals at the end of the summer. A present trend which it has been suggested may be of great long-term significance is that the proliferation of irrigation schemes and the growth of dry farming in winter grazing areas is forcing herdsmen to forsake winter pastures earlier than normal. The sheep therefore return to the hill pastures early in the spring when the seedlings of shrubs, which germinate before the first flush of grass, are the only available fodder. These shrubs are a very important component of the vegetation cover, and are especially valuable for protecting and stabilizing the soil surface. They are aromatic and later in the season they are not very palatable to grazing animals as alternative food is available. These shrubs are also collected on an enormous scale for fuel. They are therefore being replaced by annual herbs and grasses which give less protection to the soil.

Too early grazing of these grasses and sedges may weaken the plants to the extent that they are unable to set seed and may even die. Any change in the relative importance of shrubs, forbs and grasses is likely to have repercussions on the water balance and soil erosion characteristics of the range as well as on its productivity and therefore deserves careful study.

One reason for the lack of attention to the introduction of rational range management practices is the apparently insuperable problem of imposing change upon the nomadic and transhumant pastoral peoples. No institutional framework exists and it is difficult to conceive of any way in which the Government could exercise any influence over traditional grazing practices.

3.2.2 Rangeland management

The only realistic options open at present for direct management of rangelands are the following:

(a) As a matter of great urgency representative areas of as many different range types as possible should be fenced off and totally protected against grazing. A large number of small areas in different environments would be of more value than a few large areas. An important activity of Forestry Department field and regional offices should be the establishment and maintenance of one or more jerib exclosures. Such exclosures would provide information on what vegetation that range was capable of supporting and would provide a source of seed for propagation of desirable species. Maintaining even small exclosures would require considerable supervision and discipline on the part of the responsible staff and would be expensive. A few well cared for exclosures would be of more value than many poorly maintained ones.

(b) A system of monitoring range condition, trends and use should be instituted in representative sample areas. International assistance in establishing such a programme could be available through the Global Environmental Monitoring System (GEMS) of the United Nations Environment Programme (UNEP). Such a programme would yield information on the precise nature of the changes taking place in the rangelands and would provide a framework in which Afghan nationals could develop expertise in this field.

(c) Model range management programmes should be established. Two basic problems attached to such programmes would be locating suitable areas and compensating the traditional users who would have to be dispossessed. A further serious problem would be that a management unit containing all the rangelands used by a given flock of sheep during the course of a year would spread over a linear range of several hundred kilometres. A more realistic approach might be to set aside model winter and summer ranges, enclose them and allow the traditional users to graze their animals under controlled conditions. A financial incentive could be used to encourage the herdsmen to adhere to the restrictions.

3.2.3 Strategy of mortality control

The above measures could at best provide a basis for the introduction of sound range management practices in the future. They could not provide short-term solutions to the urgent problem of range deterioration. The only option open here is to adopt a rational strategy of mortality control. The proximate causes of death of livestock are slaughter for consumption and disease, the latter ultimately strongly influenced by food availability. The Government can influence mortality by providing incentives to people to market their animals and by the type of veterinary care it makes available.

A significant attempt to increase the utilization of the surplus sheep population was the creation of the Herat Livestock Development Corporation and the construction of an abattoir capable of processing and exporting one-eighth of the national sheep surplus per annum. This project has encountered some initial difficulties but if it can become fully operational it will be the single most important range conservation activity in Afghanistan. Production need not be limited by lack of demand, which is very high throughout the Middle East.

The second option open to the Government, that of influencing mortality patterns through the type of veterinary services that it provides, has been dealt with in a series of recommendations made to the Government by an FAO Animal Health Project (Woodford, 1978). The basic argument is that the resources available for veterinary services can be allocated in different ways and the strategy adopted will influence the mortality patterns and hence total population size and the balance between livestock and range capacity.

At present a disproportionately large part of veterinary resources is used in vaccination programmes against those diseases of major mortality. Little is done to alleviate the effects of the diseases that reduce the productivity of the survivors. It is obviously necessary to have

particularly rinderpest, and vaccination against diseases of productivity

such as foot-and-mouth disease and sheep pox is also justified. Highest priority should, however, be given to the treatment and prevention of such chronic debilitating diseases as lung worm, liver fluke and stomach worms.

It is estimated that the rangelands of Afghanistan can support 15 million sheep, this figure being based upon the carrying capacity of winter pastures. The Veterinary Service should be aware of the fact that any of its programmes which tend to allow the population of sheep to rise above this figure will in the long run only increase the amplitude of the cyclical fluctuations in numbers which are ultimately dictated by fodder availability. In recent years the sheep population has been estimated to vary between 13 and 22 million and under existing policies such fluctuations will continue. The present sheep population is estimated to be 19 million and increasing toward another inevitable crash. Such a wasteful use of an important resource is not only the cause of serious environmental damage but also represents a great economic loss to the country.

3.2.4 Artificial water supplies

One other aspect of present range management deserves mention. This is the practice of providing artificial water supplies in areas where surface water is not naturally available. This is obviously a valid strategy for dispersing grazing animals over areas that would not otherwise be available to them. Great care needs to be exercised, however, in creating new water supplies in very dry areas. The fact that these areas may support some vegetation may be due only to the fact that they have been unavailable to grazing animals in the past; the vegetation may degrade very rapidly and irreversibly under the influence of the uncontrolled grazing that follows the provision of water. One strategy that is employed in Australia is to allow only small catchment dams as opposed to boreholes and wells in areas receiving less than 250 mm of rainfall. The logic is that these dams will only provide water in periods immediately following significant rainfall at which time the pastures would be best able to resist grazing pressure. This strategy might well be appropriate to southern and western Afghanistan.

3.3 FORESTS

Of the forest that once covered a large part of Afghanistan, only remnants remain and most of these are severely degraded and are no longer capable of sustaining exploitation. It is estimated that 2.2 million ha (about 3.4% of the area of the country) still support forest (see Table 9 and Map 9). Of this, only in a few rather small areas in the east is the forest relatively intact and could still be used for commercial forestry. Studies of forestry have been supported by aid missions from West Germany and France and by a series of FAO projects, but none of these has resulted in the establishment of a true forest management programme. The principal problems and perspectives of the main forested areas are summarized below.

Table 9

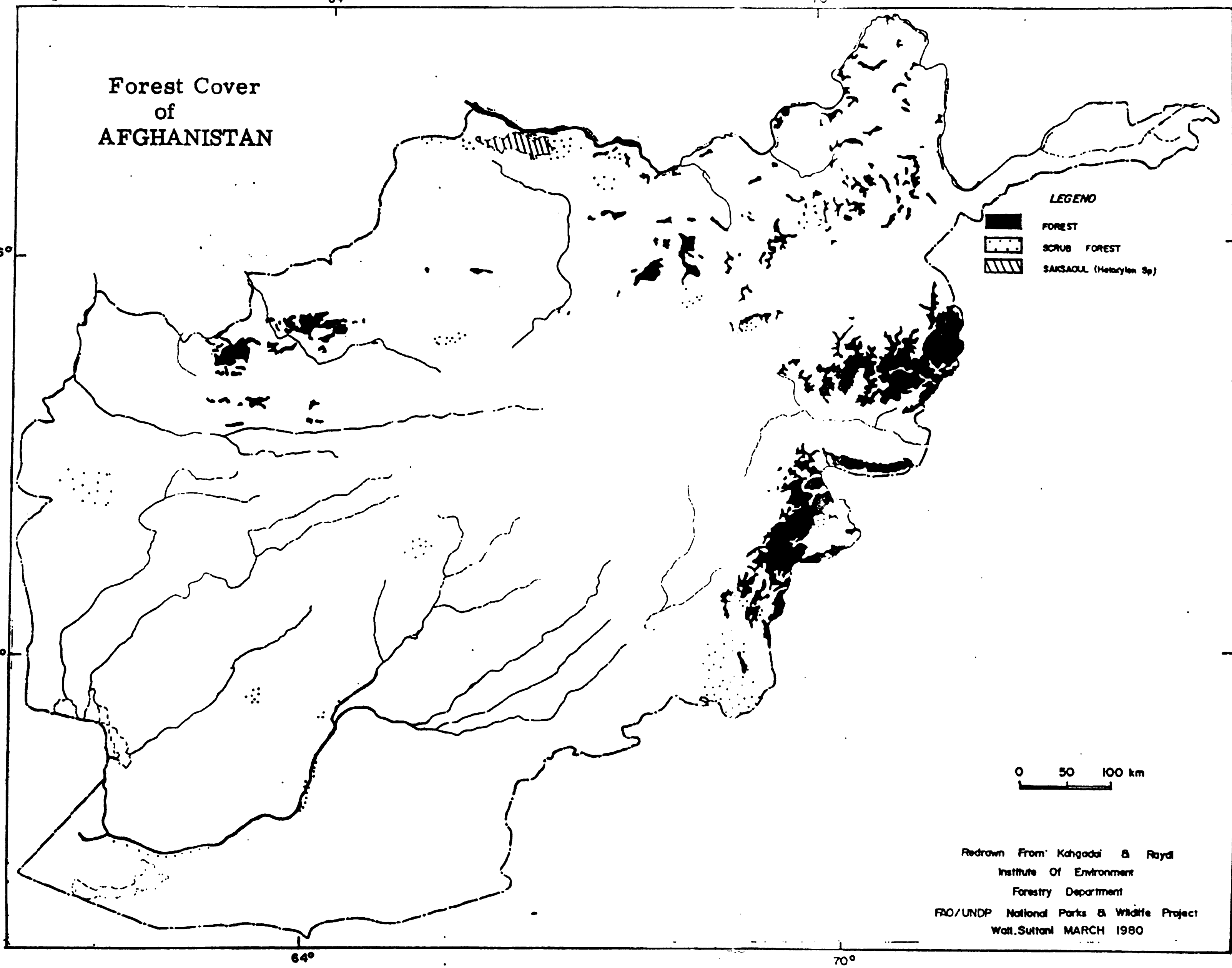
FOREST TYPES AND AREAS IN AFGHANISTAN
(based on Lalande, in McClure, 1979)
('000 ha)

Lower *Amygdalis* woodland	5 136.3
Pistacia atlantica woodland	8 845.2
Upper *Amygdalis* woodland	5 639.4
Pistacia vera woodland	5 697.9
Juniperus seravschanica woodland	6 165.9
Olea –*Reptonia* woodland	468.0
Quercus forest	994.9
Pinus forest	1 034.8
Cedrus forest	783.8
Abies-*Picea* forest	156.0
Sub-tropical scrub and woodland	239.2
Total coniferous forest area	1 974.6
Total forest area	2 213.8
Total forest and woodland area	[illegible]

3.3.1 Kunar

Some 66 500 ha of well preserved conifer forest remain. It is estimated that this contains 25 million m^3 of usable timber out of a national total of 28.9 million m^3. It is therefore by far the largest forest area in Afghanistan. The main species of commercial value are *Cedrus deodara*, *Picea morenda*, *Pinus excelsa* and *Abies webbiana*. In 1973 it was estimated that the area produced 86 000 m^3 of sawn timber, but because of the inefficient logging and transporting techniques, this represented 145 000 m^3 of timber felled. It was estimated that the forest could sustain a yield of 100 000 m^3 which, allowing for the same proportion of wastage, would have yielded 60 000 m^3 of sawn timber. The over-exploitation was thought to result in the permanent destruction of 1 000 ha of forest per year. More recent studies have shown that as much as 70% of the timber felled is wasted and that an average of 18 months elapses between felling and sawing. An attempt was made to introduce a pilot, sustained yield, logging and reafforestation programme for the Diwagal forest north-east of Asadabad. This met with opposition from local inhabitants, who saw it as competing with their own commercial forestry activities, and it has now been suspended. The problem is that at present most of the wood is exported clandestinely to Pakistan where prices are much higher. The ruggedness of the terrain and the independent nature of the inhabitants renders the problems particularly intractable and it is unrealistic to imagine that the Government could impose modern forestry practices on the entire area. It is recommended that attempts to establish a pilot management area be continued, and that this operation be supported by sociological studies to determine how best to reconcile the needs of the local communities with the objectives of managing and conserving the forests.

Map 9


Forest Cover
of
AFGHANISTAN
64°
70°
36°
32°
LEGEND
FOREST
SCRUB FOREST
SAKSAOUL (Haloxylon Sp)
0 50 100 km
Redrawn From: Kohgadai & Raydi
Institute Of Environment
Forestry Department
FAO/UNDP National Parks & Wildlife Project
Wali.Sultani MARCH 1980

In order to provide an alternative source of fuelwood and construction timbers, trials have been carried out with 16 species of *Eucalyptus* to determine their suitability for growth in plantations in islands in the Kunar river downstream from Asadabad. The gravelly detritus comprising the islands is unsuitable for normal agriculture and it is estimated that 2 000 ha suitable for *Eucalyptus* are available. The most suitable species is thought to be *Eucalyptus camaldulensis*. These trials have importance for the rest of Afghanistan where there are extensive areas of river gravels with adequate groundwater and no alternative use. Such plantations also serve to stabilize river courses and trap sediment. At present 165 ha have been planted.

3.3.2 Paktia

In 1973 the province contained 14 500 ha of exploitable forest containing 2.13 million m^3 of industrial wood, but the 300 000 m^3/year of wood being extracted was resulting in the destruction of 5 000 ha of forest per year. Both the reports of the Deutsche Forstgruppe Paktia (1969) and FAO (1973) estimated that the forests would be totally destroyed in three years. FAO estimated the sustainable yield at 22 000 m^3/year. The German team made some progress in establishing a forest management programme, but they have now abandoned the area and no recent information is available. It is unlikely that much industrial timber remains. The province also contained 165 000 ha of degraded forest and 210 000 ha of wooded pastures; these areas contain extensive stands of wild olive (*Olea ferruginea*) and oaks (*Quercus baloot*). The former species could produce commercial quality olives if grafted with domestic varieties. The latter was the main source of the 80 000 t fuelwood and 11 000 t charcoal exported from the province each year in the sixties and sent to Pakistan and Kabul. Two interesting stands of the palm *Chamaerops ritchienna* exist between Khust and Jagi Madanin. These are at present degraded through excessive cutting of the fronds for basketmaking, but under proper management could produce a crop of timber and fronds.

Insurgency is preventing the Department of Forests and Range from maintaining its forest conservation programme in the province. When a resumption of this work is possible the priorities should be:

(a) A survey to determine the extent of the remaining forests.

(b) The establishment of strategically placed protected forests to maintain seed stock.

(c) A further attempt to establish a pilot forest management programme.

3.3.3 Nangahar

Some 3 000 ha of productive forest remained in 1973 containing 170 000 m^3 of industrial timber; 500 ha per year were being destroyed. The sustainable yield at that time was 1 800 m^3. An FAO report on this area recommends total protection of these forests.

3.3.4 Kabul Greenbelt

The only systematic afforestation in Afghanistan is the Kabul Greenbelt project. However, many of the exotic species being used are unsuitable and management standards in the nurseries and the plantations are poor. This results in a low survival rate. There is also some ambivalence concerning the objectives of the programme. Some people regard it as an exercise in watershed management whose objective is to control runoff and erosion and to reduce dust in the city; others consider it as a cosmetic operation intended to beautify the landscape. The result is that neither objective is satisfactorily achieved. The programme needs thorough revision and it is essential that precise objectives should be defined for each of the areas concerned and that results should be monitored. At the present state of knowledge, all plantation forestry in Afghanistan must be considered experimental but it does make good sense to concentrate the programme around Kabul where supervision will be easier and the impact will be more readily perceived. Familiarity with the programmes will facilitate recruitment and training of foresters. There are sound justifications for amenity plantations within the city and one is proposed for the slopes surrounding Kole Hashmat Khan. A demonstration watershed management area is also an urgent requirement and the Chemtala watershed appears to be suitable. Planting and maintaining a variety of ill-adapted trees on the hillsides will have little value if unrestrained grazing and browsing of the areas between the trees destroy the shrub and herb cover. The perennial shrubs and grasses are more important in determining the runoff characteristics of the watershed and in stabilizing the surface soil against erosion than the trees. The species of trees at present planted have to be irrigated; they are therefore very expensive to maintain; their impact on erosion and runoff is negligible; they will have little visual impact and have no value as a source of wood.

The reason for this rather detailed criticism of the Kabul Greenbelt project is that there is a widely held view that plantation forestry should be an important activity in conserving soils and water throughout Afghanistan. In most situations plantations will not prove to be cost effective in respect of either wood production or watershed protection.

3.3.5 Pistacchio forests

The pistacchio (Pistacia spp) was once a widespread indigenous tree in Afghanistan. Productive pistacchio forests now only occur in the north where they cover an area of 300 000 ha in Badghis province and produce about 2 000 t nuts a year. The trees are sparsely distributed in steppe landscapes at densities of 15-20/km^2. Many of the trees are old and browsing by domestic animals is preventing regeneration. In addition, many are cut for fuel, a wasteful use of a tree whose crop is very valuable. Studies of ways to conserve the pistacchio areas are urgently required; the establishment of cooperatives to manage the forests should be considered. Special efforts should be made to conserve the genetic diversity of the natural populations of these trees.

3.3.6 Fuelwood

As stated in Section 1.4, wood is not an appropriate fuel in Afghanistan. The government strategy in the short term should be actively to promote the use of fossil hydrocarbons (gas and coal) as domestic energy

sources. In the longer term maximum use should be made of the micro-hydroelectric and solar energy potential available. This would relieve the pressure on the existing forests and enable their production to be used more rationally as a source of construction timber.

Studies in the Herat area have shown that inhabitants of the town now use 1.5-2.0 m^3/year of fuelwood, mainly Pistacia spp and Haloxylon spp. Nomads in surrounding areas use up to 4.3 m^3/year of wood equivalent, mainly Artemisia and animal waste. The production of irrigated plantations of Fraxinus, Populus and Salix is 15 m^3/year and 800 ha would provide for the present fuel needs of the city.

It will soon not be possible to meet the fuel needs of the major towns from the rapidly disappearing natural forests. Large-scale fuelwood plantations could meet some of the need but most of the suitable land could be better used for food crops. There are of course many areas which are so remote that it would not be feasible to supply them with fossil fuels. A large proportion of the needs of these communities could be met from solar and hydroelectric energy but this would require massive investments which are unlikely to materialize in the foreseeable future. In these situations wood is the only realistic fuel source and one of the priority forestry activities should be the development of village level plantations to produce fuelwood and construction poles. Village level forestry is already quite well developed in Afghanistan and the role of the Forestry Department should be restricted to such extension activities as will enable the individual farmer to improve his wood production and make more efficient use of the timber produced. This could be done by providing more productive varieties of trees and helping to control diseases. There appears to be very little justification for the Government itself becoming involved in plantation operations.

As regards the protection of the existing forests, the main conclusion is that a continuation of the present destruction is in the short term inevitable. Given the nature of the areas concerned it is quite unrealistic to envisage physical protection of the forests by legislative and police action. One course of action with slightly greater potential for reducing consumption of firewood would be to control the distribution system within the major towns. A tax could be imposed on the transporter or retailer. Logistically this would be feasible since nearly all the timber is transported by truck on a small number of main roads. Politically any such action would be quite unacceptable unless it were linked to a scheme to make alternative fuels available at comparable prices.

In the long term the strategy for the eastern conifer and hardwood forests should be to manage them for a sustained yield of lumber. The difficulties inherent in such a proposition are indicated by the problems encountered by an FAO project attempting to apply modern forest management techniques to relatively small areas in the Kunar Valley near the border with Pakistan. These problems are mostly of a social and political nature and are not technical; they are not amenable to quick solutions, but rather require that incentives be provided to encourage the inhabitants of the area to adopt rational management practices under the guidance of a forestry extension programme.

The problem is complicated by the fact that the forests are near to the international border between Pakistan and Afghanistan. The impact of any forest management strategy adopted in Afghanistan will be severely

- Give high priority to protecting rare or endangered animals and plants such as the Marco Polo sheep, markhor, Bactrian deer, snow leopard and Siberian crane. Hunting of these animals and the sale of their derivatives should be banned.

- Protect wild ancestors of close relatives of economically important plants and animals.

- Initiate pilot management programmes for urial, Persian wild goat and ibex.

- Carry out inventories and protect wild or primitive fruit and nut trees. Representative germ plasm material should be propagated in botanical gardens.

- A quota system for hunting wild animals should be initiated for all appropriate species.

- The sale and export of skins and furs of wild animals should be channelled through a government marketing organization.

F. INSTITUTIONAL AND LEGISLATIVE FRAMEWORK

The Department of Forest and Range is responsible for the management of forest and range resources. However, hardly any legislative base for these activities exists. A forest law has been drafted but still needs revision. Resources and qualified staff are concentrated in Kabul. Local forestry staff are responsible to the Provincial General Director of Agriculture.

Recommendations

- An environmental unit should be established within the Ministry of Planning and headed by a Deputy Minister. Its tasks should be:
  - The promotion of inter-ministerial coordination of activities affecting environmental quality.
  - The review of the environmental implications of all development programmes.
  - The preparation and monitoring of environmental law.
  - Liaison with international environmental organizations.
  - The coordination of environmental education within Afghanistan.
  - The promotion of environmental training and awareness amongst the personnel of government departments concerned with rural land use.
- The Government should immediately strengthen the conservation capability of the Department of Forestry and Range through training, legislation and increased financial resources.

diminished if no control is exercised over trade in wood across the border. At present large but unknown amounts of fuelwood and lumber are smuggled across to Pakistan.

Aside from considerations of maintaining the production of these forests, there are sound reasons for setting aside some representative forest areas as inviolate reserves where not only the trees but also the associated flora and fauna would be preserved. The establishment of such areas would pose many of the same problems as have confounded other forest management programmes. It would also be necessary to conduct a thorough inventory of forest resources to determine the most appropriate areas for total protection.

Natural forests have become so scarce and the areas remaining are subject to such threats that in order to be sure of preserving the maximum genetic variety of indigenous trees an arboretum should be established in or near Kabul. An attempt should be made to collect as wide a variety as possible of indigenous trees (including geographic and ecological varieties) and to propagate small populations of each type. Such an arboretum could be managed so as to be suitable for recreational and educational visits. It could be especially valuable as a training area for forestry department staff. Detailed records would need to be kept concerning the origins of the trees being propagated. It might be possible in the future to maintain a wider variety of genetic material in seed form using modern methods of low temperature storage. It is particularly important that different wild varieties of the genera Pistacia and Amygdalis should be preserved as they may provide genetic material for improving their domestic derivatives.

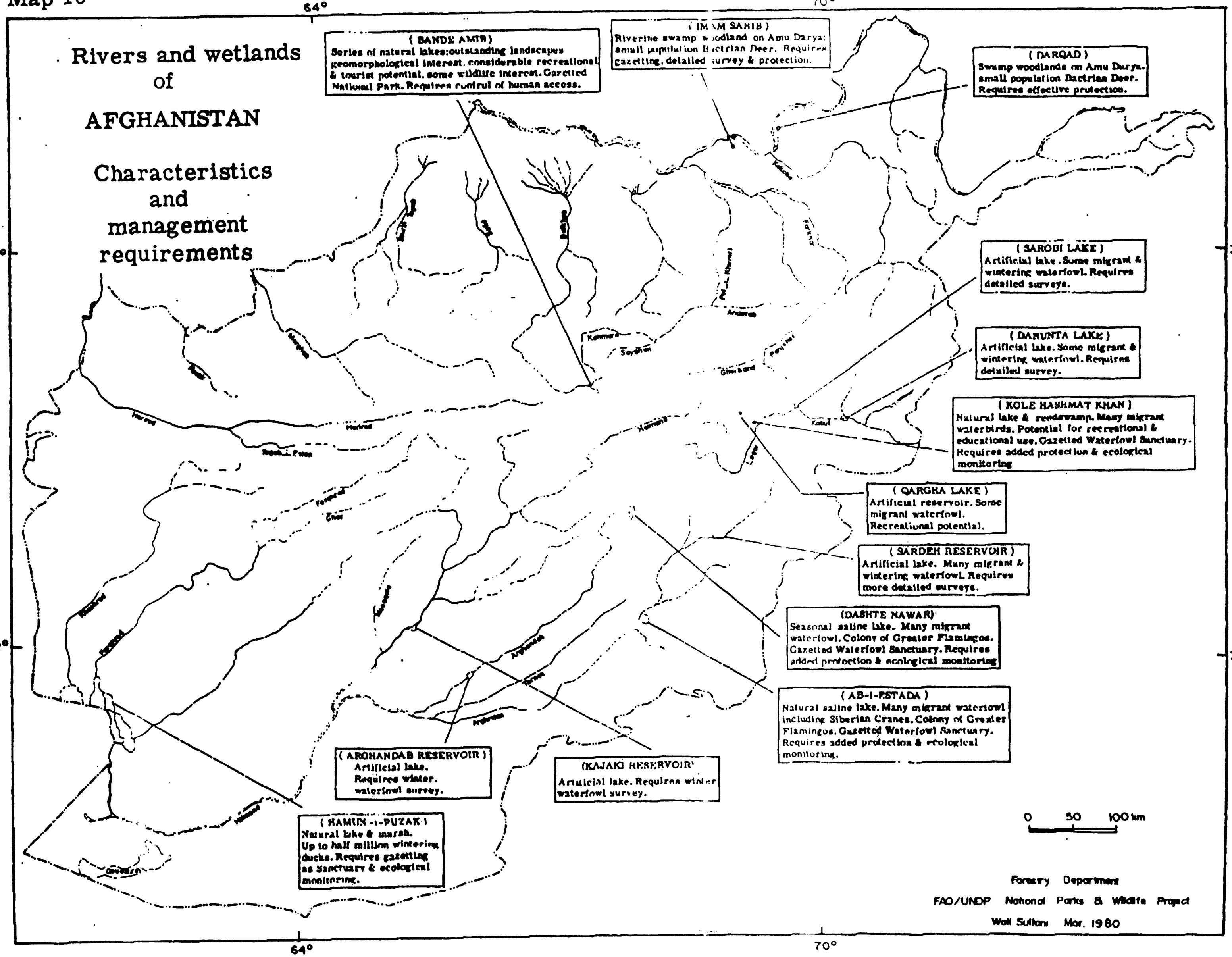
3.4 WETLANDS

The fact that most of Afghanistan is very dry adds to the importance of the few wetland areas that do exist. These wetlands are of three types (see Map 10).

3.4.1 River courses

Usually in deeply incised valleys and liable to great seasonal variation in water level, most are subject to intensive human use. Where-ever rivers are bordered by fertile soils these are irrigated. Most of the unmanaged rivers have sandy or rocky beds and are not particularly rich wildlife habitats. The Amu Darya is an exception in that it meanders through an extensive area of natural marsh and scrub (Salix spp). Areas of scrub, presumably Salix spp and Tamarix spp, also exist along some of the rivers in the southwest. Under climax vegetation conditions the river valley ecosystems have supported forests and a variety of wildlife. The lack of soil along most contemporary river courses is a consequence of erosion following removal of the vegetation by cutting and overgrazing. Under natural conditions a rich fauna would have occurred including some large mammals now rare or extinct in Afghanistan. A good example of a riverine marsh-woodland complex exists in the upper Ajar Valley wildlife reserve. Where the Ajar river emerges from the Jawarzi canyon on to the level valley floor it spreads out into an area of dense scrub and meadows, which is subject to seasonal flooding. This small area of natural vegetation contains a herd of introduced Bactrian deer (Cervus elaphus bactrianus). The value of Ajar reserve would be greatly enhanced if an

Map 10


Rivers and wetlands
of
AFGHANISTAN
Characteristics
and
management
requirements
(BANDE AMIR)
Series of natural lakes:outstanding landscapes geomorphological interest. considerable recreational & tourist potential. some wildlife interest. Gazetted National Park. Requires control of human access.
(IMAM SAHIB)
Riverine swamp woodland on Amu Darya: small population Bactrian Deer. Requires gazetting, detailed survey & protection.
(DARQAD)
Swamp woodlands on Amu Darya. small population Bactrian Deer. Requires effective protection.
(SAROBI LAKE)
Artificial lake. Some migrant & wintering waterfowl. Requires detailed surveys.
(DARUNTA LAKE)
Artificial lake. Some migrant & wintering waterfowl. Requires detailed survey.
(KOLE HASHMAT KHAN)
Natural lake & reedswamp. Many migrant waterbirds. Potential for recreational & educational use. Gazetted Waterfowl Sanctuary. Requires added protection & ecological monitoring
(QARGHA LAKE)
Artificial reservoir. Some migrant waterfowl. Recreational potential.
(SARDEH RESERVOIR)
Artificial lake. Many migrant & wintering waterfowl. Requires more detailed surveys.
(DASHTE NAWAR)
Seasonal saline lake. Many migrant waterfowl. Colony of Greater Flamingos. Gazetted Waterfowl Sanctuary. Requires added protection & ecological monitoring
(AB-I-ESTADA)
Natural saline lake. Many migrant waterfowl including Siberian Cranes. Colony of Greater Flamingos. Gazetted Waterfowl Sanctuary. Requires added protection & ecological monitoring.
(ARGHANDAB RESERVOIR)
Artificial lake. Requires winter. waterfowl survey.
(KAJAKI RESERVOIR)
Artificial lake. Requires winter waterfowl survey.
(HAMUN-i-PUZAK)
Natural lake & marsh. Up to half million wintering ducks. Requires gazetting as Sanctuary & ecological monitoring.
64°
70°
36°
32°
Harirod
Kabul
Helmand
Arghandab
0 50 100 km
Forestry Department
FAO/UNDP National Parks & Wildlife Project
Wali Sultani Mar. 1980

additional area downstream from the canyon could be incorporated into the reserve and allowed to develop natural woodland. It would be necessary to reintroduce some of the indigenous tree species that no longer occur in the area. Further research might suggest other mammals and birds that would naturally have existed in the Ajar and that could be reintroduced. One possibility is the rare sub-species of the pheasant Phasianus colchicus principalis that occurs in similar riverine areas along the Amu Darya.

3.4.2 Lakes and marshes

Many of Afghanistan's rivers have no outlet to the sea and drain into a series of depressions from which water is lost by evaporation. This results in the formation of large shallow saline lakes and marshes, the most extensive being those of Seistan in the southwest. The beds of these wetlands are made up of fine sediments transported by the rivers; these and the mineral rich waters are highly fertile and for this reason the wetlands are amongst the most biologically productive ecosystems in the country. Seven of the areas have been visited by project staff and three of them are considered to be of international importance for migrating and wintering waterfowl. There are many other small wetlands about which no information was obtained, some of which may prove to be of conservation value.

The outstanding importance of the three wetlands, Hamun-i-Puzak, Ab-i-Estada and Dashte Nawar, is as habitat for water birds. None of these natural wetlands appears to be of great economic importance; most are too saline to support fish. Drying out lake margins and reed (Phragmites spp) beds provide some summer grazing and where they are not too saline lakes provide water for human and livestock use. There is a limited market for reeds as a construction material. Nobody derives a living from Ab-i-Estada or Dashte Nawar. Less than 2 000 people, who live around Hamun-i-Puzak, make a living by fishing and harvesting reeds and waterfowl.

3.4.2.1 Amu Darya

The extensive areas of semi-natural marshland and scrub along the Amu Darya are amongst the richest wildlife areas in the country. A few Bactrian deer survived, at least until recently, in this area and the last tiger (Panthera tigris) to be killed in Afghanistan was shot 30 years ago near Darqad. The Soviet side of the Amu Darya is intensively used for agriculture and such use will presumably be developed on the Afghan side. The relatively great hydroelectric potential may in the future lead to the construction of dams which will secondarily be used for irrigation. A survey of the area should be carried out to identify areas that need protection.

3.4.2.2 Hamun-i-Puzak

The Seistan wetlands are the most important wintering area for ducks in Afghanistan, the numbers visiting the area each year varying according to climatic conditions in the Caspian area and water levels in wetlands in eastern Iran. The construction of the Kajaki dam on the Helmand river has resulted in the diversion of most of the flow of that river to agricultural use. Hamun-i-Helmand and Hamun-i-Saberi are therefore deprived of water and are no longer important as waterfowl habitat. The Hamun-i-Puzak receives most of its water from the Khash Rod and is the most important

remaining wetland. In January 1976 half a million waterfowl were counted on Hamun-i-Puzak. This was considered to be an exceptionally poor year and in a normal year well over one million ducks might be found on the lake.

This area meets the criteria of the Wetlands Convention (see Section 4.7) for recognition as a wetland of international importance; the contiguous Iranian part of the Seistan wetlands is already a scheduled site. Hamun-i-Puzak is one of the most important natural areas in Afghanistan and should receive recognition as such by being gazetted as a nature reserve. The site does not, however, appear to be threatened at present. The greatest need is to acquire greater knowledge, not only of the birds, but of the general ecology of the lake.

Propositions have been made to harvest the vast reed beds in this and other Afghan wetlands for the manufacture of pulp and paper. However an FAO study in 1974 pointed out that similar schemes in the USSR had failed because of the difficulty of harvesting reeds mechanically without damaging the roots. The report recommended that this programme should not be pursued in Afghanistan.

3.4.2.3 Ab-i-Estada and Dashte Nawar

Ab-i-Estada and Dashte Nawar have both received considerable attention from naturalists. They are readily accessible from Kabul and as well as being very important habitat for migrant and wintering waders and ducks, they also support large breeding colonies of greater flamingos (Phoenicopterus ruber). Ab-i-Estada also has the distinction of being regularly visited by the entire western population of the endangered Siberian crane (Grus leucogeranus). This population, which breeds in Soviet Kazakstan and winters at Bharatpur in India, now numbers only 33 individuals. Its decrease is thought to have been caused by the destruction of its breeding grounds by agricultural development.

Up to 10 000 greater flamingos have been seen at Ab-i-Estada and several thousand pairs breed. Smaller numbers occur at Dashte Nawar. In 1979 the waterfowl were counted at Ab-i-Estada. About 2 000 ducks of nine species were present in mid-April and 2 000-3 000 coots were present in April and May, but by far the most numerous birds were waders. In April and early May at least 15 000 waders of 26 species were estimated to be present. The commonest were little stints (Calidris minuta) and ruffs (Philomachus pugnax). There is very little human activity in the vicinity of either lake and the greatest threats to their conservation come from agricultural activities in the upper catchments. These might affect the supply of water to the lakes and change their chemical composition. The highest priority is to study the hydrological regime of the lakes in order to be able to predict the consequences of different development strategies adopted in the catchments. It would be important to link such studies to those of the aquatic micro-organisms that constitute the food of the birds. The effect of the Sardeh irrigation programme in the Ab-i-Estada catchment should be further studied. The Gardez river, which was dammed at Sardeh, is the most important source of water for Ab-i-Estada and there is a risk that the lake level will decrease and its salinity increase because of the operations at Sardeh.

Another threat to the flamingos comes from egg collecting and other disturbance of the breeding colonies. To guard against this a warden system is needed in the summer. Hunting is probably not a serious threat as the means available to the local people would not enable them to kill very large numbers of birds. Hunting on specified sections of the lake shore with moderate bag limits could be allowed in winter with no real harm to the duck populations.

Well advanced plans exist for the construction of warden and research field stations at both lakes. This would greatly facilitate the ecological monitoring and protection programmes.

3.4.2.4 Kole Hashmat Khan

Another natural wetland that deserves special conservation is Kole Hashmat Khan on the outskirts of Kabul. This lake and reedswamp (*Phragmites* spp) of 191 ha is a remnant of the extensive wetlands that used to exist in the Kabul basin. It was kept as a shooting preserve by the kings of Afghanistan and more recently has been protected by the Republican Guards as a waterfowl sanctuary where occasional shooting is allowed. Its importance lies in its proximity to Kabul, which makes it an ideal centre for recreational, conservation education and research activities. It is surprisingly rich in birds: up to 20 000 ducks and coots may be present on the lake in winter. In 1979, 14 species of ducks and 25 species of waders and a wide variety of other marsh birds were recorded. It is proposed to construct a conservation education centre on the lake shore but this has been delayed because of uncertainty about jurisdiction over the area. The lake has considerable historical interest, the Bala Hissar fort and an old cemetery being in close proximity. The site should be protected and the landscape enhanced by tree planting.

3.4.3 Artificial lakes

Several lakes have been formed by dams constructed for irrigation and hydroelectric purposes. They are usually in steep-sided valleys and subject to large fluctuations in level. Their depth and fluctuating levels make them less suitable for the establishment of aquatic vegetation and the rocky margins are poorer habitat for shorebirds than the muddy margins of natural lakes. Because water flows through them, they do not tend to become saline and they therefore support good populations of fish; consequently fish eating birds are more numerous than they are on natural lakes. Some of these lakes considerably enhance the landscapes in which they exist and have potential for recreational development.

3.4.3.1 Qargha lake

Qargha lake, 10 km from Kabul, is the only one where an attempt has been made to realize this potential; a golf course and club have been built on the lake shore and there is an attractively landscaped hotel and restaurant complex. The lake was managed for trout fishing in the past and a natural style swimming pool, fed by outlet water, was an added attraction. Little use is made of these facilities today but the infrastructure is sound and the area could rapidly be developed for intensive recreational use by people from Kabul. The lake is used by migrating and wintering waterfowl but is much less rich than the nearby natural lake of Kole Hashmat Khan.

3.4.3.2 Sarobi and Darunta lakes

The artificial lakes at Sarobi and Darunta in the Kabul river are an attractive feature of the parched landscapes of Afghanistan. Sarobi is used as a recreational area by people from Kabul and a hotel has been constructed on the lake shore. Darunta lake may provide recreational possibilities for the people from Jalalabad. A third lake, Sardeh in Ghazni province, is rather remote, and although it is the most attractive of the three it is seldom visited. All three support large numbers of waterfowl at times. Fish eating birds are particularly well represented; five species of grebes (Podiceps spp) have been recorded in a single day from Sarobi and Darunta. There is no information on the recreational or conservation value of the two large reservoirs at Kajakai or Arghandab in Kandahar province but it is likely that they will be used by large numbers of waders and ducks in the non-breeding seasons.

Artificial lakes make a positive contribution to the quality of the Afghan environment. They are not, however, of such outstanding value as to merit high priority in the allocation of conservation resources. As a long-term objective, it is recommended that seasons and bag limits be established for waterfowl hunting and that other recreational uses be encouraged wherever appropriate.

3.5 WILDLIFE CONSERVATION

This section deals with the problems of the conservation and management of individual species. Most of the information concerns the larger and more conspicuous mammals and birds. The conservation of species of plants, invertebrates and the less conspicuous higher animals is also important, but in the present state of knowledge, conservation of these groups must be achieved through the management of entire ecosystems: the problems are therefore covered in the three preceding sections. Wildlife conservation in Afghanistan should concentrate on those species which are of value to man. Man attaches value to wildlife for a large number of reasons; these range from the direct commercial values of species that are harvested to the equally important, but harder to quantify, values attributed to animals because of their aesthetic, sporting or scientific interest. In discussing the allocation of resources for species conservation, it is necessary to make judgements on a number of factors, the most important of which are:

(a) the value or importance of the species;

(b) the nature and severity of the problems, if any, that threaten the survival or abundance of the species;

(c) the likelihood of conservation measures being successful.

Thus a species might be of very high value but the nature of the threat to it might be such that with the resources at our disposal we would not be likely to influence its survival. Another species might be less important but simple management action might be adequate to safeguard it. In this case the strategy should be to ensure survival of the second species rather than wasting money and staff on an attempt to conserve the first. The following species or groups of species are either of such value or are sufficiently endangered in Afghanistan to justify conservation action.

3.5.1 Mammals

Several Afghan mammals are included in the IUCN Red Data Book; others merit special protection and management because of their scientific or commercial value (see Maps 11-13).

Endangered mammals found in Afghanistan from IUCN (1978) Red Data Book, Volume 1, Mammals (* not yet recorded from Afghanistan):

Species	English name	Status
* *Cuon alpinus*	Dhole or Indian wild dog	Vulnerable
Canis lupus	Wolf	Vulnerable
Selenarctos thibetanus laniger	Himalayan black bear	Endangered
* *Felis caracal michaelis*	Caracal	Rare
Panthera pardus	Leopard	Vulnerable
Panthera tigris virgata	Turanian tiger	Endangered
Panthera uncia	Snow leopard	Endangered
Acinonyx jubatus	Asiatic cheetah	Endangered
Equus hemionus	Onager or wild ass	Vulnerable
Moschus moschiferus	Musk deer	Vulnerable
Cervus elaphus bactrianus	Bactrian deer	Endangered
Capra falconeri	Markhor	Vulnerable
C. f. megaceros	Markhor	Endangered
C. f. jerdoni	Markhor	Endangered

The Marco Polo sheep (*Ovis ammon poloi*) is, more than any other, the mammal associated with Afghanistan. It is not included in the Red Data Book, but it is very rare and deserves special conservation measures. This species epitomizes the high barren mountains of northeast Afghanistan and rightly deserves to be considered the national animal. It is not the largest wild sheep in the world; the Tibetan argali, *O. a. ammon*, is heavier, higher at the shoulder and has more massive horns. The Marco Polo sheep has longer more flared horns and a mature male " ... is surely one of the most impressive representatives of the entire order Artiodactyla," (Roberts, 1977). The various races of *Ovis ammon* closely resemble and in the west of their range interbreed with *Ovis orientalis* and for this reason have been united by many authors within the single species *Ovis ammon* (Heptner et al., 1961). However, within Afghanistan the two forms are geographically isolated and morphologically distinct and their conservation can be dealt with separately. The present distribution of the Marco Polo sheep is shown in Map 11a. It is probable that the range of the Marco Polo sheep has never been much more extensive. The Venetian traveller Marco Polo described the sheep 700 years ago from the same area of the Pamirs that is still today its main stronghold. Outside Afghanistan, Marco Polo sheep occur in Chinese Turkestan, where their numbers are thought to have been much reduced by hunting by Chinese military personnel, and in Russia, where they are protected and quite plentiful in the Tagdumbash Pamirs and the mountain ranges between the headwaters of the Iritish and the Amu Darya.

In Afghanistan about 2 500 Marco Polo sheep are thought to exist in the Big Pamir and an unknown additional number in the Waghjir valley of the Small Pamir (Petocz, 1978). A sport hunting programme organized by the Afghan Tourist Organization (ATO) operated in the Big Pamir in 1968-78. The offtake was limited to 12 mature rams per year and the programme afforded protection to the rest of the population. The ATO was attempting to limit grazing by domestic stock in Marco Polo habitat. The hunting permit fees were high and generated considerable foreign exchange earnings for the country and the inhabitants of the Pamirs benefited from employment with the hunters.

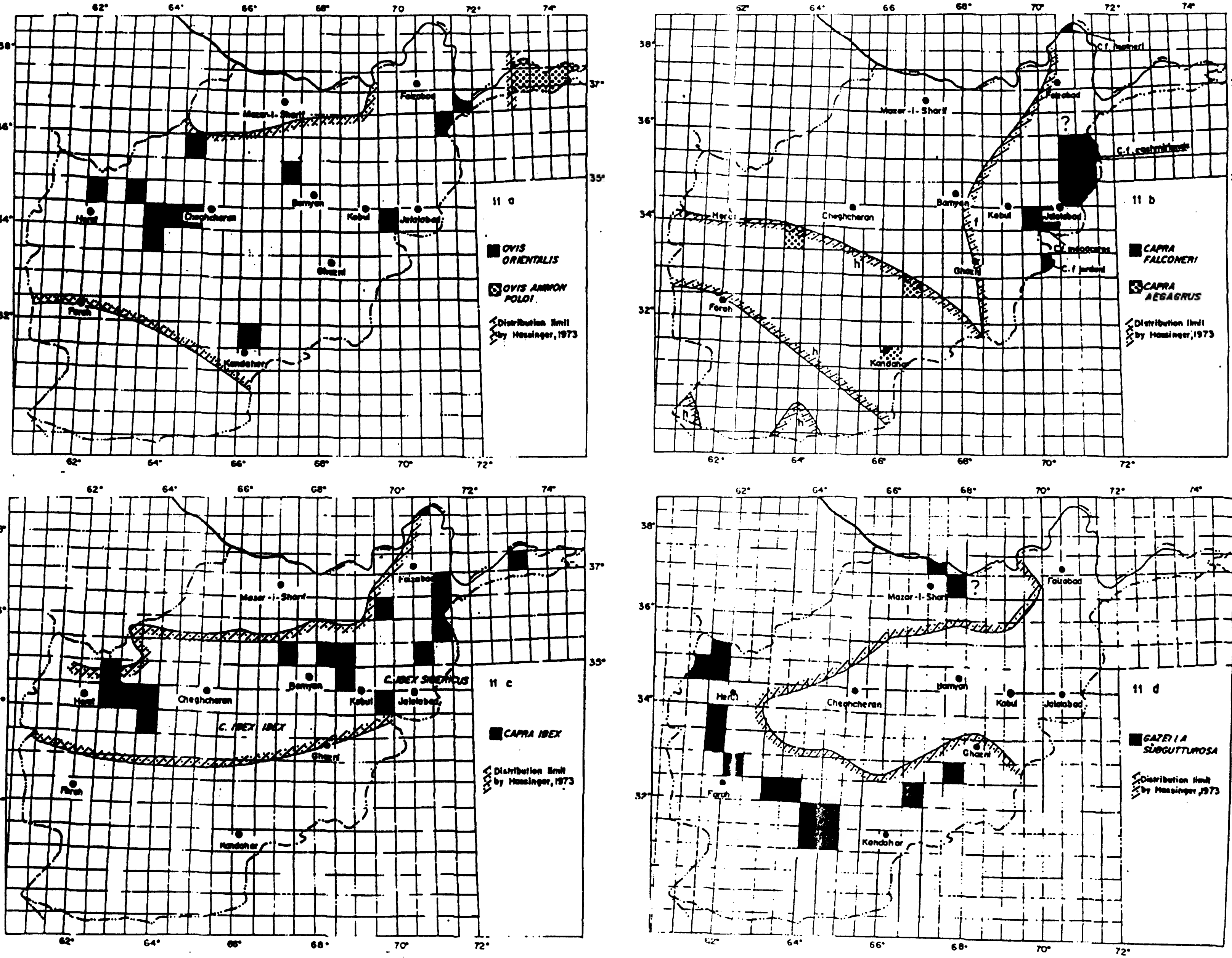
Strategy for the conservation of this magnificent animal depends initially upon establishing control of the area. When this is achieved, the hunting programme should be resumed. The Forestry Department must improve its monitoring of population size and range condition and must strive to reduce grazing by domestic animals in Marco Polo habitat. In the longer term, the central part of the range of the Marco Polo sheep should be totally protected as a national park. In the short term, the hunting programme represents the best chance of gaining some control over the area and protecting the species. Eventually this programme should be phased out or restricted to a buffer zone around the park.

The total population of the Marco Polo sheep is so small and so restricted in its range that it could be susceptible to almost total elimination by disease. Rinderpest is known to have severely reduced numbers at the turn of the century (Lydekker, 1907), probably after being transmitted by domestic stock. Little can be done to protect a wild population from this disease. A first step would be to ascertain the frequency of rinderpest antibodies in blood samples from the animals killed by hunters. The problem is that the logical solution of completely isolating the Marco Polo sheep from potential sources of rinderpest would result in a population with no resistant individuals so that if the disease were eventually to be accidentally introduced it might cause even more damage than if sporadic exposure had continued to occur.

The other endangered member of the Caprinae found in Afghanistan is the markhor (Capra falconeri); two of the four races that occur in the country are included in the Red Data Book. The different races of the markhor occur in the mountains of eastern Afghanistan; they do not extend into the arctic-alpine habitat of the ibex (Capra ibex) or into the arid mountains where the wild goat (Capra aegagrus) is found. They have, however, in the past probably inhabited all other mountain areas. In Pakistan they still occur in reduced numbers from the Quercus ilex forests of the north to the dry steppe mountains of northern Baluchistan. The present distribution of the four sub-species in Afghanistan is shown in Maps 11b and 20. The major threats to the survival of markhor come from excessive hunting and competition with domestic goats. Their scattered distribution and inaccessible habitat give them some degree of protection against both these threats but also make conservation action difficult. The best prospects lie in the establishment of either totally protected areas or controlled hunting areas where reasonable populations of each sub-species still occur. A first step towards this would be a more detailed survey of the present status and distribution of the species.

The three remaining caprids, the urial (Ovis orientalis), the wild goat (Capra aegagrus), and the ibex (Capra ibex), are fairly widely distributed in suitable areas. Their distributions are shown in Map 11 a, b and c. All three suffer intensive hunting but they appear to resist this quite well;

Map 11



11 a
OVIS ORIENTALIS
OVIS AMMON POLOI
Distribution limit by Hassinger, 1973
11 b
CAPRA FALCONERI
CAPRA AEGAGRUS
C.f. cashmiriensis
C.f. megaceros
C.f. jerdoni
Distribution limit by Hassinger, 1973
11 c
CAPRA IBEX
C. IBEX SIBIRICUS
C. IBEX IBEX
Distribution limit by Hassinger, 1973
11 d
GAZELLA SUBGUTTUROSA
Distribution limit by Hassinger, 1973
Herat
Mazar-i-Sharif
Faizabad
Bamyan
Kabul
Jalalabad
Cheghcheran
Ghazni
Farah
Kandahar

a greater threat to their survival probably comes from competition with domestic sheep and goats. These species are in no great danger of becoming extinct but they do merit conservation action. Their greatest interest lies in their close affinities with domestic sheep and goats; the wild populations are very variable and must certainly have genetic characteristics of value in improving domestic varieties. These species are also much sought after by hunters, both those who seek trophies and those who hunt for meat.

There is great potential for managed hunting programmes but, as in many aspects of conservation in Afghanistan, the limited resources available can best be deployed in establishing management programmes in a few specified areas where the likelihood of success is high. For urial and ibex the obvious place for a management programme is the area surrounding the Ajar Valley wildlife reserve where a degree of control already exists. There is insufficient information on the distribution and status of the wild goat to permit recommendations about whether it might be managed or preserved and the greatest need is for more thorough surveys. There is considerable justification for the establishment of captive stocks of all the varieties of sheep and goats both to conserve them and to provide animals for reintroduction into areas from which they have been exterminated.

Only four other species of artiodactyls occur in Afghanistan. A further species, the common gazelle (Gazella dorcas) occurs in the Baluchistan province of Pakistan near the Afghan border and almost certainly in southern Afghanistan. This and the goitered gazelle (Gazella subgutturosa) are species highly adapted to the steppes and deserts of western and central Asia. They must have been extremely numerous in the past but are very susceptible to hunting, especially from vehicles, and are now rare. They are attractive animals and make efficient use of desert vegetation but the creation of suitable reserves in the vast areas of the southeast would present many practical difficulties and there would be no guarantee that these highly mobile animals would remain in them (Map 11d).

The wild boar (Sus scrofa) is widespread in its habitat of rank vegetation and cultivated land along the main rivers (Map 13b). It is not hunted by the Moslem population. There is potential for the improvement of the organization of sport hunting for foreigners. Considerable revenue could be derived from such hunting programmes.

This leaves the two species of deer found in Afghanistan. The Bactrian deer (Cervus elaphus bactrianus) is endangered throughout its world range which is limited to a few areas of thicket vegetation along the Amu Darya and the tiny isolated population in the Ajar valley (Map 13c). In the 19th century it was still widespread in the forests along the Amu Darya and Syr Darya rivers and in northern Afghanistan as far south as the Kokcha river. Under climax vegetation conditions, its habitat would have extended over much of north central and eastern Afghanistan; its present relict status reflects the destruction of its habitat that has occurred in the past millennia. The sub-species must be considered to be highly endangered, firstly because the small isolated herds could very easily be hunted to extinction and secondly because of the potential risk presented by such diseases as rinderpest. Conservation action should concentrate on a status survey in the Darqad and Iman Sahib areas along the Amu Darya and on protecting the Ajar Valley. The maintenance of a captive herd is also highly desirable as this would enable the sub-species to be reintroduced to areas of former habitat from which it has been exterminated. A small group is now

- **The Department of Forest and Range should be in sole charge of the management of national park and conservation areas such as the Ajar Valley, the Pamirs, Bande Amir and Kole Hashmat Khan.**

- Provincial forestry staff should be directly responsible to the Headquarters in Kabul.

- The Department of Forest and Range should recruit ecologists from the Faculty of Sciences, especially for the Nature Conservation Programmes.

- New legislation should provide a solid background for the creation and management of a system of conservation areas representing all ecosystems of Afghanistan. The following categories should be covered:

  I Totally Protected Areas
  - National Park
  - Nature Reserve

  II Protected areas with some management
  - Game Management Reserve

  III [illegible]
  - [illegible]
  - Protected Forest and Range Areas
  - **Range Management Areas**

  The law should provide, for land-use and water resource planning, criteria for physical delimitation of protected areas, management planning, species protection, and penalties and permits.

- **Training. High priority should be given to the establishment of a technical Forest and Range Training Institute with specialization in range and watershed management, forestry management and wildlife and national park management. Foreign assistance should be sought, especially for staff who can assist local lecturers in preparing practical study programmes.**

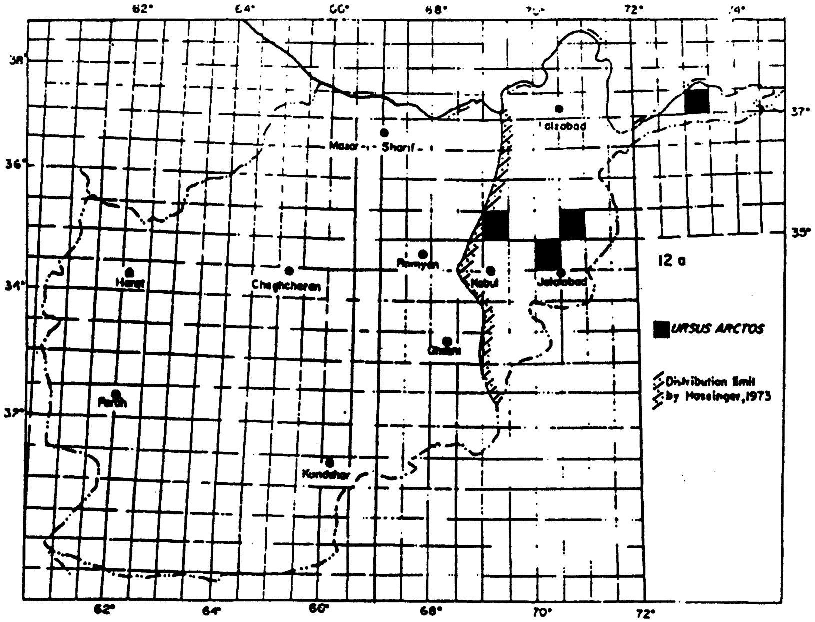
- **Emphasis should be given to the involvement of students in field research programmes such as the pilot programmes on rangeland, forestry and national park management.**

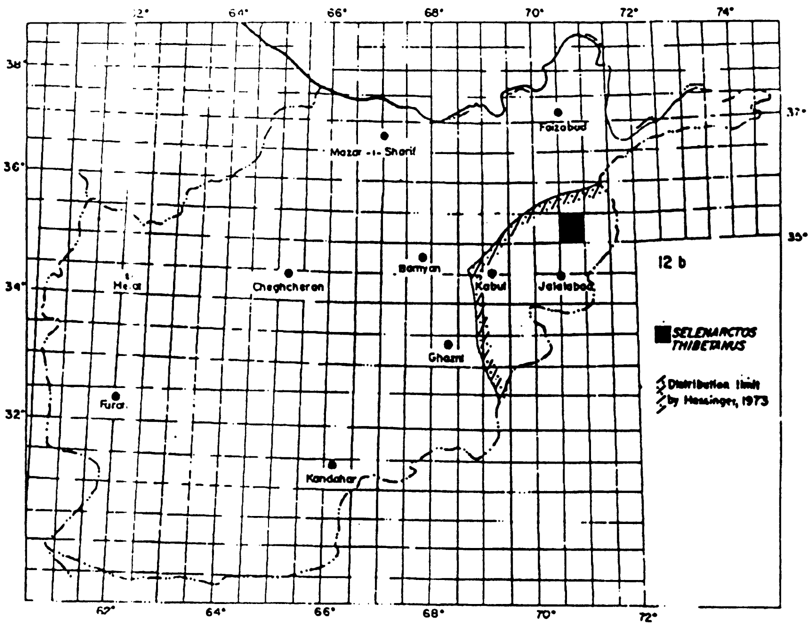
- **Cooperation with other departments, especially the veterinary department, should be sought for a common policy on rangeland and livestock management.**

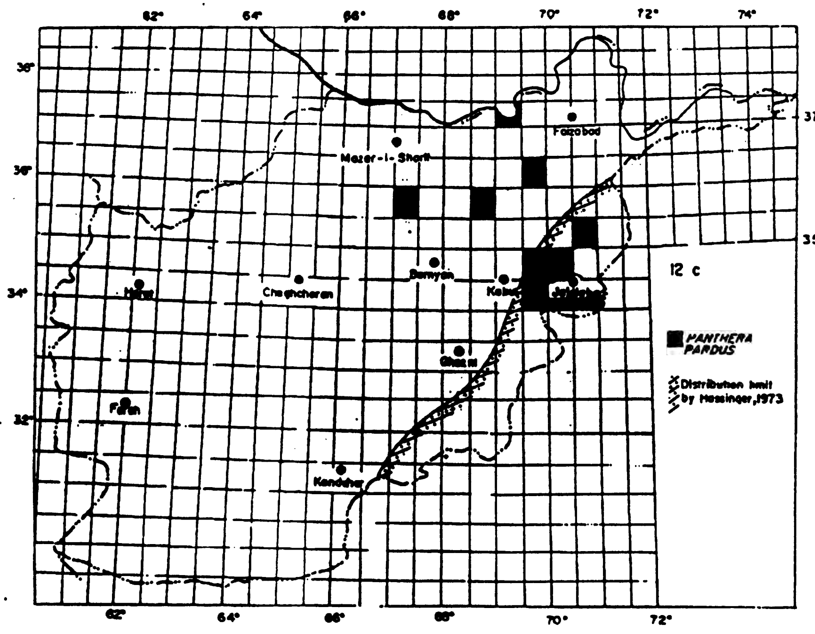
G. INTERNATIONAL BODIES AND COOPERATION

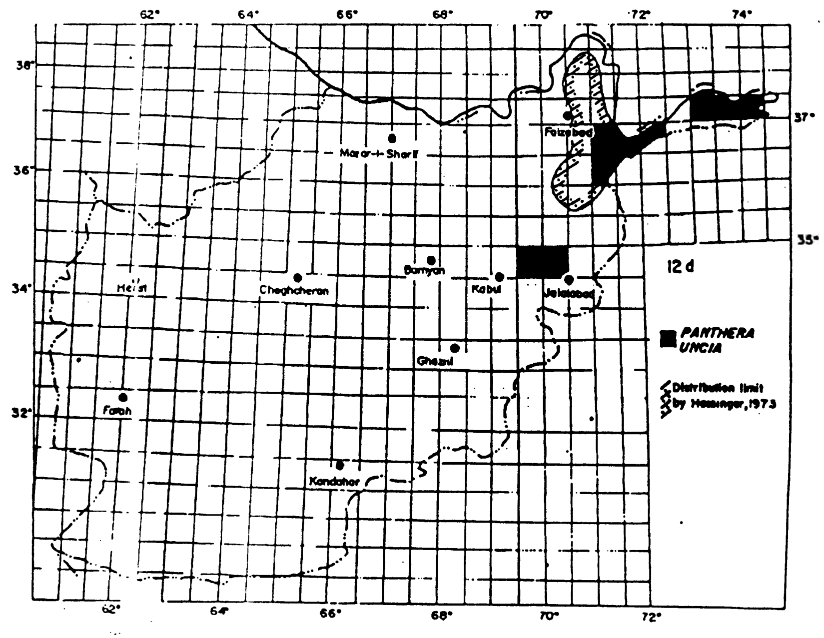
Much knowledge on Afghanistan's problems is available in the neighbouring countries and some living resources can be conserved only by international action.

Map 12


12 a
Faizabad
Mazar-i-Sharif
Bamyan
Kabul
Jalalabad
Herat
Cheghcheran
Ghazni
Farah
Kandahar
URSUS ARCTOS
Distribution limit by Hassinger, 1973


12 b
Faizabad
Mazar-i-Sharif
Bamyan
Kabul
Jalalabad
Herat
Cheghcheran
Ghazni
Farah
Kandahar
SELENARCTOS THIBETANUS
Distribution limit by Hassinger, 1973


12 c
Faizabad
Mazar-i-Sharif
Bamyan
Kabul
Jalalabad
Herat
Cheghcheran
Ghazni
Farah
Kandahar
PANTHERA PARDUS
Distribution limit by Hassinger, 1973


12 d
Faizabad
Mazar-i-Sharif
Bamyan
Kabul
Jalalabad
Herat
Cheghcheran
Ghazni
Farah
Kandahar
PANTHERA UNCIA
Distribution limit by Hassinger, 1973

kept at Kabul zoo and could form the nucleus of a more substantial captive herd. One problem to be considered in a population which is so small and fragmented is the need to avoid excessive inbreeding. The exchange of one or two stags between the Ajar Valley and Kabul zoo herds would contribute to the genetic health of both populations.

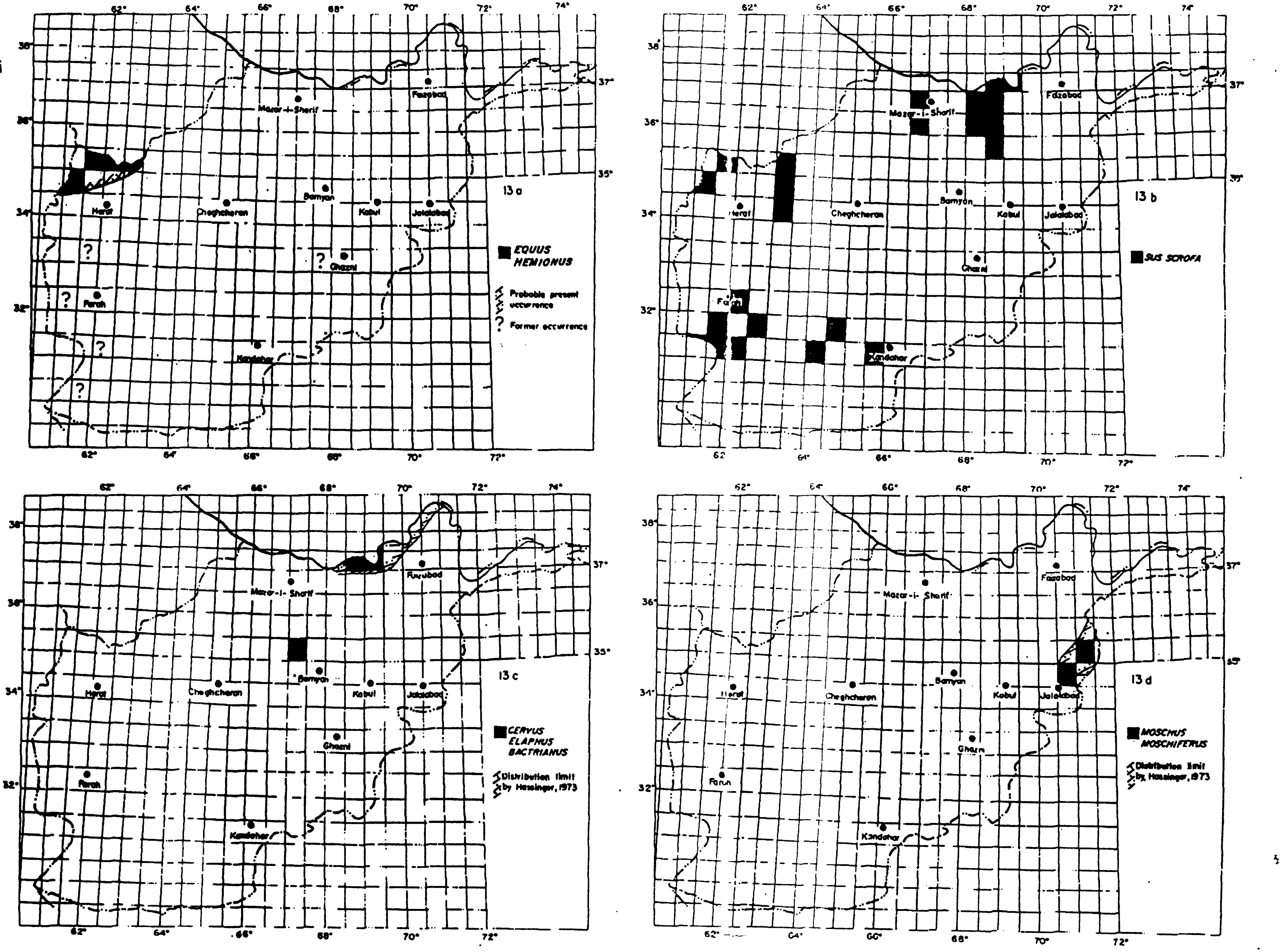
The musk deer (Moschus moschiferus) occurs in mountain forests throughout central and eastern Asia. It is solitary and inconspicuous and may still be quite numerous in areas where it is protected by remote and difficult terrain. In more populated regions it has now become increasingly rare as it is hunted intensively partly for its meat and skin but more significantly for the musk pods on the abdomen of adult males. The musk is used as a fixative for perfumes and is very valuable. In Afghanistan a few musk deer still occur in the forests of Nurístan. Direct action to conserve such dispersed and solitary species is difficult and the best strategy will be to ensure that suitable habitat is included in any future protected areas created in the region.

A single species of perissodactyl may still occur in the extreme northwest of Afghanistan. This is the onager or Asiatic wild ass (Equus hemionus) (Maps 13a, 25). This very rare animal is protected in a reserve in Soviet Turkemenistan in an area adjacent to the Afghan border northwest of Herat. Petocz (1978) reports that small herds sometimes wander into Afghan territory. The species was widespread in Afghanistan in the past. It is recommended that a survey be carried out of the region where they have been reported to see if a suitable area exists for the establishment of a reserve.

The last remaining group of mammals which require special conservation measures are the fur-bearers. There is a well-established fur industry in Afghanistan which has been studied by Rodenburg (1977). Several hundred thousand skins are exported or incorporated into articles for export annually. It is estimated that 25 000 people derive their living from trapping, processing and retailing furs. In 1973 the Government introduced a total ban on the sale and export of furs. This was prompted by plagues of small rodents in the northern provinces; it was believed that this resulted from the extermination of natural predators. The ban resulted in a large increase in exports as dealers attempted to reduce stocks and in the development of a clandestine trade through Pakistan which had not at that time ratified the Convention on International Trade in Endangered Species (CITES). However, skins, including those of endangered species such as leopard (Panthera pardus) and snow leopard (Panthera uncia) are still offered openly for sale in the bazaars.

As FAO (1977) pointed out, it was quite unrealistic to impose a total ban on the trade in furs when there was no prospect of enforcing it. The strategy to be adopted should be to create legislative and institutional structures to control the trade, a first step being to ratify CITES, then to attempt to limit the numbers of skins on the market. This should be coupled with measures to control the quality of the product. At present many skins are wasted and the price of the remainder is well below world market level because a large proportion of the skins are damaged or poorly processed. The trade could probably generate more revenue by exporting smaller numbers of high quality skins. The trade in certain rarer animals should be halted immediately; this would be of little economic significance as trade in these species is on a very small scale. A total ban on the following species was proposed by Rodenburg:

Map 13



13 a
Mazar-i-Sharif
Faizabad
Herat
Cheghcheran
Bamyan
Kabul
Jalalabad
Ghazni
Farah
Kandahar
EQUUS HEMIONUS
Probable present occurrence
Former occurrence
13 b
SUS SCROFA
13 c
CERVUS ELAPHUS BACTRIANUS
Distribution limit by Hassinger, 1973
13 d
MOSCHUS MOSCHIFERUS
Distribution limit by Hassinger, 1973

Leopard	Panthera pardus
Snow leopard	Panthera uncia
Lynx	Felis lynx
Blanford's fox	Vulpes cana
Yellow throated martin	Martes flavigula
Asiatic cheetah	Acinonyx jubatus
Caspian tiger	Panthera tigris virgata
Caracal	Felis caracal

The last three species are believed to be extinct in Afghanistan but the ban on trade would contribute to their protection in neighbouring countries.

To facilitate the above measures, it is proposed that all export of skins and furs of wild animals should be channelled through a government controlled marketing corporation. Ultimately such a corporation could regulate supply through a quota and hunting permit system. Now that Pakistan, Iran and the USSR have ratified CITES the possibility that such a monopoly could be circumvented by smuggling is lessened.

Direct measures for the conservation of fur-bearing animals are limited by lack of knowledge of their distribution, status and ecology. The strategy to be adopted should be to give special consideration to these species in determining the location and extent of protected areas. No action outside protected areas is likely to have any impact.

3.5.2 Birds

The only comprehensive account of the birds of Afghanistan is that given by Paludan (1959) who gives records of 389 species of which 231 were thought to breed. Other more recent publications bring the total number of species recorded to about 460. For a large number of species the present knowledge is quite inadequate to permit any reasonable conclusions concerning their conservation; this is especially true of less conspicuous and locally distributed birds. The overall priority in bird conservation is exactly the same as that for all other faunal and floral groups, the establishment of a system of protected areas covering groups of birds which are of particular significance to man and which do have special conservation problems in Afghanistan.

The rich waterfowl populations of Afghanistan's wetlands provide a magnificent spectacle and constitute an economic resource of considerable potential both for local subsistence hunting and for sport hunting. Some conservationists have been alarmed at the sight of large numbers of wild birds, and especially ducks, offered for sale in the bazaars in Kabul. They have assumed that such an offtake is going to endanger the survival of the wild populations and have called for bans on hunting. Little information exists on the numbers of ducks consumed in rural areas, but the total number of waterfowl sold in Kabul is quite insignificant in relation to the populations involved. In addition the hunters and traders have an interest in preserving stocks of quarry species and in any case a ban on hunting would be quite unenforceable. It is therefore recommended that the strategy adopted should be to legitimize the trade and then gradually try to exert some control over hunting methods, seasons and offtake.

The greatest threats to the waterfowl that visit Afghanistan lie in profound changes in land use in their breeding grounds in the Soviet Union and in their ultimate wintering areas in the Indus valley. In the longer term there is a need for greater liaison between the governments of these countries on the subject of the conservation of migratory species. Very few individuals of the waterfowl species that are commonly hunted actually nest within Afghanistan. Of the species that do nest, most are species of herons (Ardea spp), egrets (Egretta spp) and waders (especially Charadrius spp and Tringa spp), which are numerous and widely distributed in the palearctic region and do not justify special conservation measures.

The one notable exception is the greater flamingo (Phoenicopterus ruber), which breeds at Dashte Nawar and Ab-i-Estada. These colonies total between 1% and 2% of the world population. All flamingos are to some extent endangered as their very precise habitat requirements render them susceptible to changes in the environment. The principal threats to the two colonies in Afghanistan are the possibility of a change in the hydrological regime or the water chemistry of the lakes resulting from irrigation and agriculture in their catchments and disturbance of the breeding colonies by people, especially egg collectors. This last threat requires the presence of guards in the breeding season.

The rarest bird known to occur in Afghanistan is the Siberian crane (Grus leucogeranus). This species exists in two distinct populations; one of these breeds in Yakutia in the eastern Soviet Union and winters in southeast Asia. It numbers about 300 individuals. The second breeds in tundra areas in Soviet Kazakstan and migrates through Afghanistan to winter at the Bharatpur sanctuary near Agra in India. The entire population apparently migrates together. They habitually stop over for some time at Ab-i-Estada during the spring and autumn migrations. As recently as 1970, 76 were recorded at Ab-i-Estada but in 1980 only 33 arrived to winter at Bharatpur and these are probably all that is left of the western population of the species. The Siberian crane is declining because of agricultural development in its breeding grounds in the Soviet Union. However, with such a highly endangered species it is desirable to protect it throughout its life cycle and an important objective of the National Parks Directorate Staff at Ab-i-Estada should be to prevent human disturbance of the Siberian cranes during their stay in the area.

Three other species of bird that occur in Afghanistan are listed as vulnerable in the Red Data Book. These are the Dalmatian pelican (Pelecanus crispus), the white-tailed eagle (Haliaetus albicilla) and the peregrine falcon (Falco pelegrinoides babylonicus). The first two species are not known to have bred in Afghanistan and only occur as occasional visitors. They do not require special conservation measures. The peregrine is endangered in many areas by contamination of its food by chlorinated hydrocarbons. These insecticides are not used extensively in Afghanistan and the peregrine is still quite widespread. These birds are much sought after by falconers and many have been exported from Afghanistan to western Europe and the Arab nations. This trade could pose a threat to the wild populations.

Two other groups of birds require mention because of the attention that they have attracted in international conservation circles. These are the bustards (Otididae) and pheasants (Phasianidae). Three species of bustard occur in Afghanistan, the great bustard (Otis tarda), the Houbara bustard (Chlamydotis undulata) and the little bustard (Tetrax tetrax). They are endangered elsewhere in their range by agricultural development of

their steppe habitat. In Afghanistan this may not be the most serious problem as most areas where they occur are too dry for any sort of agriculture. Bustards are, however, very easy to hunt from vehicles and they are especially sought after by falconry enthusiasts. They have become rare or extinct in many areas where they could previously be hunted and there has been demand in recent years to organize a bustard hunting programme in Afghanistan. Such a programme should only be allowed with strict limits on numbers killed and the fee should be high.

Of the nine species of Phasianidae known to occur in Afghanistan, two, the Himalayan monal (Lophophorus impejanus) and the Koklaas (Pucrasia macrolopha) may be threatened by the destruction of their habitat in the forests in the east. A third species, the widely distributed Phasianus colchicus, is represented in Afghanistan by the rare sub-species P. c. bianchii and P. c. principalis. These are also threatened by destruction of swampy thickets along the Amu Darya, Mughab and Hari Rud, but also by hunting. In the case of all three conservation requires the establishment of protected areas. A fourth member of the family, the Himalayan snowcock (Tetraogallus himalayensis), is widespread in high mountain areas in the centre and northeast of the country but could be threatened by over-hunting. Trade in this species should be banned.

A great deal of further study of the birds of Afghanistan is needed to identify conservation problems and to build up the expertise necessary for future conservation action. The greatest single priority is the establishment of research and protection facilities at Ab-i-Estada. This area is the single most important bird habitat in Afghanistan and, being relatively accessible from Kabul, it could provide a useful site for training Afghan conservationists in bird research and protection techniques.

3.5.3 Reptiles

Two species of reptiles found in Afghanistan are listed in the Red Data Book. These are the Central Asian cobra (Naja oxiana), classed as endangered, and the Central Asian grey monitor lizard (Varanus griseus caspius), classed as vulnerable. The latter species is exploited for its skin, flesh and trophies and is included in Schedule I of the CITES Convention (see Appendix 1); trade in it is therefore banned by countries that have ratified the Convention. Little is known of the status of either species within Afghanistan and no special conservation measures are proposed.

3.5.4 Hunting

During the migration seasons many people hunt large numbers of ducks, waders, thrushes and larks. During the months of March and April the bazaars of Kabul, Charikar and many other towns offer large numbers of birds for sale. People use artificial and live decoys to attract the birds which are then shot or caught with snares or traps.

Wild ungulates are also frequently hunted, both for their meat and simply for sport. Hunting from vehicles has nearly exterminated the wild ass and goitered gazelle from the steppes and plains of Afghanistan. Fur-bearing animals are hunted commercially. Some 3 000-4 000 professional hunters operate in the country, most of them to the north of the Hindu Kush.

They concentrate on the larger species with valuable furs such as the snow leopard, leopard, wolf, lynx and foxes. Smaller animals such as cats, otters, martens, etc. are trapped by the villagers who sell them to the dealers in the larger towns. The main centre of trade is Kabul.

A complete ban is proposed on the sale of furs of species that are rare or in danger of becoming extinct. These are the leopard, Caspian tiger, snow leopard, lynx, Blanford's fox, yellow-throated marten, Asiatic cheetah and caracal.

3.5.4.1 Local hunting

Marco Polo sheep (Ovis ammon poloi) are hunted extensively by the Kurghis in the Small Pamir, using rifles and dogs. The population of Marco Polo sheep is more than 1 000 and the annual take is 100-150. The hunt is non-selective. In the Big Pamir, with an estimated Marco Polo population of 800, traditional hunting was successfully banned by the Afghan Tourist Organization and replaced by a trophy hunting programme for tourists (Petocz, 1978).

Markhor (Capra falconeri) are frequently hunted by the local people. In the Kunar modern rifles are used and villagers who are successful hunters are held in great esteem. Visitors from Kabul also occasionally go to the Kunar for trophy hunting. In Nuristan at least 35 markhor are shot annually out of an estimated population of 600 (Petocz, 1978).

Ibex (Capra ibex), wild goat (C. aegagrus) and urial (Ovis orientalis) are hunted everywhere in the Hindu Kush and there are trophies of these animals on many shrines in the central mountains.

3.5.4.2 Organized hunting

The Afghan Tourist Organization arranges trophy hunting programmes in the Big Pamir and the Ajar valley. In the Big Pamir annually 12 Marco Polo rams and 5 ibex are taken and in the Ajar valley 10-15 ibex are taken out of an estimated seasonal population of 5 000. Some urials are also taken from the Ajar valley. Urial and wild pig (Sus scrofa) hunting parties are arranged elsewhere in the country. New trophy-hunting tours have been proposed in southeastern Badakhshan (urial and ibex), Nuristan (markhor and ibex) and the Small Pamir (Marco Polo sheep). A new quota of 18 Marco Polo sheep for the Big Pamir has been introduced.

3.5.4.3 Sport hunting and population quality

Properly managed hunting programmes are a valid and acceptable way of conserving wildlife and managing habitats. Their development should be a government priority. Populations can be managed to achieve different objectives. The crop of carcasses or pelts can be optimized by heavy shooting and taking a higher proportion of males than females. To obtain good quality trophies, it is necessary to hunt fewer animals so that the average age of the population increases. It is also necessary to hunt females as a means of preventing the population increasing so much that its food supply would be inadequate. Persistent selection of the best trophy animals would lead to long-term deterioration of the quality of the population. It is important that obviously poor animals are also culled. At present it is not possible for the Government to exert much control over hunting; the long-term aim should be firstly to achieve control of the number of animals taken in each area and then to acquire more information on ecology and behaviour of the species concerned.

3.5.4.4 Proposed hunting ban

Attempts have been made to ban hunting in Afghanistan. It is unrealistic to think that this traditional activity can be prevented by legislative action. Such a ban would in any case be undesirable. Wildlife will only be conserved if the people attach a value to it. For most rural Afghans the only value of wildlife is as a source of food or sport. The Forestry Department will be better able to exercise control over hunting if the legislation is not too restrictive. Measures to limit hunting should be concentrated in the parks and on endangered species. Otherwise control should be limited to the introduction of closed seasons, restrictions on hunting methods and on the sale of hunting produce and on the age and sex of animals killed. Successful hunt management will best be achieved if Forestry Department staff work with rather than against the hunters. They should be encouraged to think of wildlife as a legitimate crop.

Hunting should be totally banned in parks and reserves. In several areas, however, controlled hunting programmes provide the only realistic means of achieving control of the areas. The Big Pamir, the Ajar valley and parts of the Nuristan mountains are of such great interest and value that they should be National Parks. In the short term, however, hunting programmes can provide the means by which control over these areas will be achieved. It is therefore recommended that hunting be allowed to continue under the same management programme as that now applied by the Afghan Tourist Organization. In the future, when full control has been obtained, hunting should be phased out within the park boundaries and restricted to buffer zones around the parks. This will be feasible when wildlife populations have increased and begin to disperse outside the park boundaries.

3.6 CONSERVATION OF GENETIC RESOURCES

Many cereal crops and fruit trees and all the sheep and goats which are important sources of man's food throughout the world were first domesticated in Western Asia and the Middle East. The crops and some of the livestock still used in Afghanistan include a range of primitive varieties. They yield less than some modern improved strains but often have genetic resistance to disease and environmental stress. The wild relatives of domestic plants and animals and the primitive varieties still in use may provide valuable material for the genetic improvement of modern crops. Their conservation should therefore receive high priority.

The principal plant species whose wild ancestors are found in Afghanistan are Pistacchio spp, Pyrus spp (pears), Malus spp (apples), Prunus spp (plums etc.), Amygdalis spp (almonds) and cereals (Triticum, Oryza etc). The tree species grow in isolated patches along the rivers and the cereals occur on the steppes and as weeds of cultivation.

The wild sheep and goats are highly adapted to the harsh climate of high mountains and arid rocky deserts and could contribute genetically based drought and cold tolerance to domestic varieties. The Marco Polo sheep is a notably large member of its genus and could be used to breed increased size into other varieties.

Conservation of these resources should have a high priority, and in 1977 the Afghan Government established a germ plasm unit in the Darulaman Research Station, Kabul, in collaboration with the International Board for Plant Genetic Resources (IBPGR). At present their main activity is the collection and storage of local cereals, especially wheat. Future plans are to collect fruit trees to be planted in a botanical garden. Apart from the importance of seed storage, national parks and reserves are important for the conservation of varieties of fruit and nut trees.

Surveys are needed of areas potentially rich in wild crop relatives. Lack of information makes it difficult to monitor genetic erosion in these species. According to IBPGR, Afghanistan should give high priority to conserving wheat and rice cultivars, a variety of fruit and nut trees (especially Pyrus and Malus spp) and a variety of vegetables, pulses, forage species, spices and the medicinal Asafitoda (FAO/IBPGR, 1979).

Domestic stock is the most important source of income for a large portion of the Afghan population (see Section 1.3.3). Many of the local sheep, goat and cattle varieties are well adapted to the harsh conditions in areas where no other land use is feasible. They make efficient use of the vast steppes and poor rangelands. Experiments with foreign sheep and hybrids showed that these could not survive the poor range conditions and that the local races are superior (Yalcin, 1979). The ancestral wild stocks however are adapted to still harsher conditions and could prove useful for further livestock improvement. The establishment and improved management of conservation areas to maintain viable populations of such animals should have high priority (FAO/UNEP, 1980).

4. INSTITUTIONAL AND LEGISLATIVE FRAMEWORK

4.1 INTRODUCTION

The conservation of the natural environment in Afghanistan should be approached at two levels:

(a) the formulation of policy, the inter-ministerial coordination of conservation actions and the assessment of development objectives in relation to conservation objectives should be handled by a senior environmental unit;

(b) the physical management of natural areas should continue to be the responsibility of the appropriate division of the Department of Forests and Range.

4.2 ESTABLISHMENT OF AN ENVIRONMENTAL UNIT

It is suggested that the senior environmental unit responsible for policy and coordination should take the form of an independent team within the Ministry of Planning, headed by a deputy minister. The deputy minister should be supported by a secretariat and a small group of specialists in specific areas of environmental management. The terms of reference of the unit should be as follows:

(a) The promotion of inter-ministerial coordination of activities likely to affect the environment. The establishment of inter-ministerial steering committees for problem areas and activities.

(b) The review of the environmental implications of all development programmes and the promotion of environmental awareness within those government departments concerned with rural development.

(c) The review and monitoring of environmental law.

(d) Liaison with international environment organizations.

(e) The coordination and curriculum planning of environmental education within Afghanistan, especially at university level.

(f) The promotion of environmental training both within Afghanistan and abroad, especially with a view to introducing greater environmental expertise into those government institutions concerned with rural land use.

The impact and effectiveness of such an environmental sub-ministry would initially be limited by the lack of sufficient Afghan nationals with the necessary knowledge and experience of environmental management. It would therefore be necessary to obtain the services of a foreign adviser in environmental planning. One of the functions of this adviser would be

Recommendations

- The Conventions on International Trade in Endangered Species of Wild Flora and Fauna (CITES), on Wetlands of International Importance and on Migratory Species should be ratified.

- Cooperation with, and assistance from, multilateral bodies and conservation organizations such as UNEP, FAO, WWF and IUCN should be sought.

- Bilateral cooperation should be sought with, for example, Iran on the development of the Seistan Wetlands, with the Soviet Union on the development of the Amu Darya and with Pakistan on the smuggling of timber and furs.

- A bilateral programme with India should be established for advanced training in wildlife and national parks at the Forest College in Dehra Dun and the Wildlife Management Institute in Hyderabad.

H. RESEARCH EDUCATION AND EXTENSION

Research should provide background information on range management policy. Public awareness of conservation issues should be stimulated. Education programmes directed at schoolchildren and students and informal information programmes directed at adults should be instituted.

Recommendations

- Initiate living resource research. This should include wildlife inventories and research on ecological processes and should be management orientated.

- Researchers should be involved in education and extension.

- A pasture land option should be included in university and high school curricula. International assistance should be sought.

- Universities should conduct basic range research and seek assistance from UNEP and the Man and Biosphere Programme of Unesco.

- Conservation Education and Rangeland Ecology should be included in the curricula of all study books for primary and secondary schools, technical schools and teacher-training institutes.

- Conservation should also be included in the transmissions of the educational broadcasting centre and the activities of the audio-visual production centre. The extension services should be concentrated in the villages, especially those close to conservation areas.

- An Education-Public Relations Officer should be based in Kole Hashmat Khan and he should arrange seminars and workshops for school groups.

to identify the specific environmental sectors where expertise would be most needed and arrange for training of Afghans in the appropriate subjects.

With an increase in environmental expertise and in the capacity of development institutions within Afghanistan to manage the environment, the sub-ministry might be raised to the level of a full ministry.

4.3 ENVIRONMENTAL TRAINING

There is a very urgent need for the staffs of the Rural Development Department and those departments concerned with irrigation, animal health and various other aspects of agricultural development to incorporate environmental considerations into their planning. It is beyond the scope of the present report to indicate the institutional measures that would be needed to make this possible, but initially it should be ensured that all decision-making staff are made aware of the conservation problems identified in Section 3 of this strategy. It is of great importance that training in environmental matters should not be limited to the future staff members of the Department of Forests and Range. Provision should be made for senior members of the Rural Development Department, the Animal Health Department, the Departments of Irrigation and Land Reform, the Ministry of Commerce and Industry, the Afghan Tourist Organization and the various other educational, research and development institutions to participate in national and international meetings, seminars and short-term training programmes in those environmental sectors related to their professional activities.

4.4 THE DEPARTMENT OF FORESTS AND RANGE

Most of the physical management action to achieve the conservation objectives identified in Section 3 should be carried out by the Department of Forests and Range. This Department, which was established in 1957, still lacks the trained personnel, the physical and financial resources and the knowledge of action priorities needed to achieve these objectives. It is recommended that the Government take immediate action to strengthen the conservation capability of the Department of Forests and Range.

The central organizational structure of the Department is satisfactory; there are four main deficiencies:

(a) most of the qualified foresters are based in Kabul and too few in the areas where the actual work of the Department is;

(b) field staff work under the provincial General Directors of Agriculture and not directly under their technical divisions at headquarters;

(c) there is no sound legislation base for forest conservation and management;

(d) most of the staff have only a basic training in agriculture with a little forestry specialization. The only properly trained foresters are those who have been abroad and they are too few in number to successfully administer the diverse forestry needs of the country.

It is therefore recommended that the Forestry Department adopt the priorities identified in Section 3, that it allocate its available staff to these priority areas and that it decentralize as much as possible.

In view of the limited resources of the Department, it should concentrate its personnel and materials on the highest priority operations. This will entail establishing pilot programmes in forest management (Kunar and Paktia), range management (Kabul), pistacchio management and conservation (Badhgis), hunting (the Pamirs, Ajar valley) and park and reserve management (Ab-i-Estada, Band-i-Amir, Ajar valley). The existence of well run pilot programmes will be of enormous value in the training of future generations of foresters and improving the performance of the present staff. Foreign aid will be needed to initiate these programmes.

4.5 LEGISLATION

There is at present no legislative base for the activities of the Forestry Department. A draft forest law exists but has not been legislated. It is recommended that this draft law be reviewed and the following propositions incorporated.

4.5.1 Creation of a system of protected areas

The most important role of the new laws should be to provide a sound legislative base for the creation and management of a system of protected areas. Natural area conservation and management will have varying objectives for the different sites involved. For any one area, the overall management policy will represent a balance of requirements to meet a combination of the following specific objectives.

I. Ecosystem conservation. The need to conserve representative examples of a wide range of ecosystems to protect the natural heritage of Afghanistan, for their scientific interest and for the possible value of individual component species.

II. Scientific research. The need to have sites where natural ecosystems can be studied and if necessary manipulated for research purposes.

III. Species conservation. The need to protect areas where species that are endangered or otherwise of special interest occur.

IV. Watershed protection. The need to maintain or improve the vegetation cover on steep slopes so as to prevent erosion and uncontrolled runoff.

V. Recreation. The need to maintain natural areas suitable for recreational use.

VI. Tourism: The need to maintain natural areas as destinations for overseas visitors. This objective differs from the last in being commercial rather than social in character.

Different management is required depending on the objectives for the site. To provide an institutional and legislative framework for this management, it is necessary to create different categories of sites. It is recommended that Afghanistan adopt two categories of totally protected areas, the first the National Park, where recreational and tourist use will be encouraged, and the second the Nature Reserve, where the primary objective will be ecosystem or species conservation and scientific research. The other categories of protected area will allow some strictly controlled exploitation. These would include controlled hunting areas which would be maintained in as natural a state as possible but where sport or subsistence hunting would be allowed. Watershed protection areas (either forests or rangelands) would also have a primarily protective role but appropriate non-conflicting uses would be allowed.

All categories should be clearly defined in the legislation. It is recommended that the following internationally recognized definitions be adopted and that the areas listed be legally gazetted in their respective categories.

1. A National Park is a relatively large area:

(i) where one or several ecosystems are not materially altered by human exploitation and occupation, where plant and animal species, geomorphological sites and habitats are of special scientific, educative and recreative interest or which contains a natural landscape of great beauty; and

(ii) where the highest competent authority of the country has taken steps to prevent or eliminate as soon as possible exploitation or occupation in the whole area and to enforce effectively respect of the ecological, geomorphological or aesthetic features which have led to its establishment; and

(iii) where visitors are allowed to enter, under special conditions, for inspirational, educative, cultural and recreative purposes; and

(iv) where killing, hunting and capture of animals and the destruction or collection of plants are prohibited except for scientific and management purposes and on the condition that such measures are taken under direction or control of the highest competent authority.

2. A Strict Nature Reserve is an area:

(i) which possesses some outstanding ecosystems, features and/or species of flora and fauna of national scientific importance; and

(ii) which is under the control of the highest competent authority of the country and to which visitors are not encouraged to go; and

(iii) throughout which any form of hunting or fishing, any undertaking connected with forestry, agriculture or mining, any grazing, any excavation or prospecting, drilling, levelling

of ground or construction and generally any act likely to disturb the fauna and flora, including introduction of zoological or botanical species, are strictly forbidden; and

(iv) in which scientific investigations (including removal of animals and plants in order to maintain an ecosystem) may only be undertaken by permission of the competent authority.

3. A Game Management Reserve is an area:

(i) set aside for the conservation, management and propagation of wild animal life and the protection and management of its habitat; and

(ii) within which hunting, killing or capture of fauna shall be prohibited except by or under the direction or control of the reserve authorities; and

(iii) where settlement and other human activities shall be controlled or prohibited.

4.5.2 Definitions of categories of forest and range land

In order that rights of usage, access and, where appropriate, management plans can be defined, it will eventually be necessary to map and categorize all forest and range land. The laws should be based upon the premise that all forest and range land belongs to the state, but as far as possible the right to exploit the land should be delegated to local communities subject to limitations imposed by the Department of Forests and Range which would be overseen by the local forest officer. The following categories should be adopted.

4.5.2.1 Management forests

Areas set aside for the sustained yield harvesting of forest products, mainly wood but, where appropriate, wildlife and minor forest products. These areas should be managed by local cooperatives following plans drawn up by the Department of Forests and Range.

4.5.2.2 Protected forest and range areas

Areas where commercial operations would be severely limited by the need to protect the vegetation and soils of catchment areas. They would be mainly areas on steep slopes or in the catchments of the major dams that would be vulnerable to erosion if deprived of their vegetation. Some use by local communities such as hunting, gathering dead wood for fuel, etc., could be allowed if it did not conflict with the conservation objectives.

4.5.2.3 Range management areas

These areas would have similar status to the managed forests but the main use would be pasturing of domestic stock. Most of Afghanistan would fall into this land category but it would obviously be unrealistic to expect to radically influence the pastoral activities of Afghanistan's nomads and sedentary stock owners in the short term. The ultimate objective of the Government should be to limit stocking rates and introduce a system

of rotational grazing. The immediate objectives must be to make detailed studies of the ecological and sociological problems involved and to set up pilot range management areas to determine how best to obtain a sustainable yield from natural pastures.

4.5.3 Other provisions

The above legislation should make specific provision for the following.

I. Physical delimitation of classified areas. Boundaries should be clearly defined, marked on the ground if possible and only changeable through the legislature.

II. Management planning. Management plans established for classified areas should be approved at ministerial level and should then become legally binding.

III. Species protection. The laws should allow for total or partial protection of individual species of flora and fauna, the establishment of seasons and areas when hunting is not permitted and restrictions on trade in wild animals and plants and their products.

IV. Penalties. Procedures for prosecution and types of punishment should be established.

V. Permits. A permit system should be established for forest exploitation, hunting and access to parks and reserves.

It should be stressed that the management plans will determine such considerations as methods used in exploiting a forest, the types and quantity of wood to be cut, stocking rates and grazing seasons for range lands, hunting quotas, seasons, methods, access to and activities within controlled hunting areas, parks and reserves.

The Government is strongly advised to seek the advice of the IUCN Environmental Law Centre in Bonn (Federal Republic of Germany) or the legal section of FAO in Rome (Italy) before finally adopting environmental, forestry and nature conservation laws. These organizations would both be able to draw upon experience in other countries which have similar ecological and social situations to Afghanistan.

4.6 TRAINING

The remaining immediate need for the strengthening of the Department of Forests and Range is to improve the quality of the training given to its staff.

At present there are two ways of entry into the Department. All prospective professional foresters must obtain their baccalaureate; this requires 12 years of schooling. Students may then take a 2-year course at the Institute of Higher Agricultural Education specializing in forestry. They then enter the Department as "Forestry Technicians"; about 30 students take this option each year. Alternatively students with the baccalaureate may apply to take a 4-year course for the degree of Bachelor of Science in

the Faculty of Agriculture. Since 1979, specialization in forestry has been possible. About 100 agricultural graduates are produced each year; it is likely that only a small proportion of these will choose the forestry option.

The Departments of Zoology and Botany in the Faculty of Natural Science should also provide staff for the Forestry Department, and action should be taken to recruit such people, especially for the nature conservation programmes.

The Institute of Higher Agricultural Education is poorly located and lacks the staff and facilities to provide an adequate technical education in forestry. It is strongly recommended that the Government seek foreign assistance to establish a technical forest and range training institute. The most suitable site would be Paghman, which has good access to Kabul yet is situated in an area where some forestry activities (nursery, plantations, range protection, etc.) exist and where there is considerable potential for further development. Proposals for the establishment of such an institute have been prepared by FAO. Its faculty would include specialists in forest management, range management and wildlife and national parks. The courses would have a strong practical orientation and students would be sent for substantial periods of their training to field stations in forest and wildlife areas.

The problems of the Faculties of Agriculture and Science stem mainly from the lack of specialized teachers of ecological, forestry and range subjects. Staff members of the Department of Forests and Range assist the faculty members by giving some courses. There is a need to bring in foreign teachers and to send Afghan graduates abroad for specialized training. It is also recommended that opportunities be provided for the existing faculty members to attend foreign institutes of forestry and ecology to strengthen their abilities in these fields.

There is great potential for members of the Faculties of Science and Agriculture to conduct field research relevant to the environmental conservation needs of the country.

4.7 INTERNATIONAL PROBLEMS AND RESPONSIBILITIES

Certain of the nature conservation problems of Afghanistan cannot be solved without collaboration with other nations. The obvious examples are those relating to species that migrate from one country to another, of animals and plants harvested to satisfy demand in another country and of rivers that flow across national boundaries. The main problems so far identified in Afghanistan are:

(a) the felling of timber in the eastern provinces for export to Pakistan;

(b) the killing of wild mammals for furs to be exported to western European markets;

(c) agricultural development of the steppes of Soviet Central Asia, which is destroying the breeding grounds of wildfowl that winter in Afghanistan. The most conspicuous example is the Siberian

crane, whose western population is approaching extinction because of the destruction of its breeding habitat on the lower reaches of the river Ob in the Soviet Union;

(d) the likely destruction of valuable wildlife habitat along the Amu Darya river if major hydroelectric developments are ever undertaken jointly with the USSR;

(e) The desiccation of wetlands in Iranian Seistan which has resulted from irrigation works within Afghanistan.

There are many conservation organizations, both governmental and non-governmental, that would be pleased to provide technical expertise and finance to the Afghan conservation movement for purely non-political motives. The existing foreign relations department of the Department of Forests and Range satisfactorily provides for communications with these international bodies. It should be encouraged to extend its contacts and activities. Similarly the proposed environmental unit within the Ministry of Planning should develop international contacts.

High priority in developing the international influence of the Afghan conservation movement should go to the ratification of the international conventions, all of which have special significance for Afghanistan. These conventions are:

1. The Convention on wetlands of international importance, especially as waterfowl habitat. Several of Afghanistan's wetlands are of sufficient value to be recognized by the Convention. Instruments of ratification should be deposited with the Director-General of Unesco, Paris, and would enable Afghanistan to participate in international programmes to monitor waterfowl populations and to benefit from expertise in wetland management and waterfowl conservation.

2. Convention on international trade in endangered species (CITES). Instruments of ratification should be deposited with the Federal Department of Foreign Affairs of the Swiss Confederation, Bern. This would strengthen the legal grounds for preventing the import of the products of rare Afghan animals into other countries party to the Convention. It would also show Afghanistan's solidarity with other member countries and would enable Afghanistan to participate in determining the detailed provisions of the Convention and the species to be included.

3. Convention on conservation of migratory species of wild animals. Instruments of ratification should be deposited with the Foreign Office of the Federal Republic of Germany, Bonn. This would form a basis for action to conserve numerous bird species that pass through Afghanistan on their migrations from the Soviet Union to the Indian sub-continent.

A fourth Convention "concerning the protection of the world cultural and natural heritage" was ratified by Afghanistan on 20 March 1979. The initiative for this ratification came from those responsible for the conservation of some of Afghanistan's outstanding cultural sites (the Minaret of Jam, the Buddhas at Bamian and the mosques at Herat and Mazar-i-Sharif). However, some of Afghanistan's natural sites are of sufficient international significance to be considered for inclusion on this list.

4.8 EDUCATION AND PUBLIC AWARENESS

4.8.1 Schools

Aside from the need to train specialist conservation managers, it is essential to give a broad base to the conservation movement by stimulating public awareness of the issues. The most promising way of achieving this is through the formal education system: 30% of Afghan children attend primary school, 12% secondary school and 6.7% lycées. Conservation education should figure in the curricula of all levels of schooling and this will require that it be widely taught at the teacher training institutes. The most rapid way of disseminating basic information about the environmental problems of the country would be to organize seminars for the lecturers at the teacher training institute.

4.8.2 Educational Broadcasting Centre

Potential also exists to include conservation in the transmissions of the education broadcasting centre which prepares half-hour radio programmes in Pushtu and Dari aimed at primary schools. Similarly, television, although restricted at present to Kabul, will provide a useful outlet for material designed to stimulate public interest in the environment.

The audio-visual production centre and the science centre produce filmstrips, slides, textbooks, maps, charts, etc. for use in schools. The latter also organizes in-service training workshops. All these government institutions could be used to disseminate conservation education material.

4.8.3 Education-Public Relations Officer

In order to make use of these opportunities it is recommended that the Department of Forests and Range create the post of education-public relations officer. His tasks would be:

(a) To liaise with the education broadcasting centre, the audio-visual production centre and the science centre to encourage them to include conservation education material in their products and to provide them with technical information relating to environmental conservation in Afghanistan as a basis for conservation teaching materials.

(b) To organize conservation seminars for teacher training institute lecturers and secondary school teachers.

(c) To establish and run a conservation education centre at Kole Hashmat Khan on the outskirts of Kabul.

4.8.4 Conservation Education Centre

The Department of Forests and Range should establish its own conservation education programme. It is recommended that this should take the form of a day centre situated at Kole Hashmat Khan Waterfowl Sanctuary near Kabul. A simple building should be constructed to house exhibits in the form of maps, charts, diagrams and photographs. Groups of students

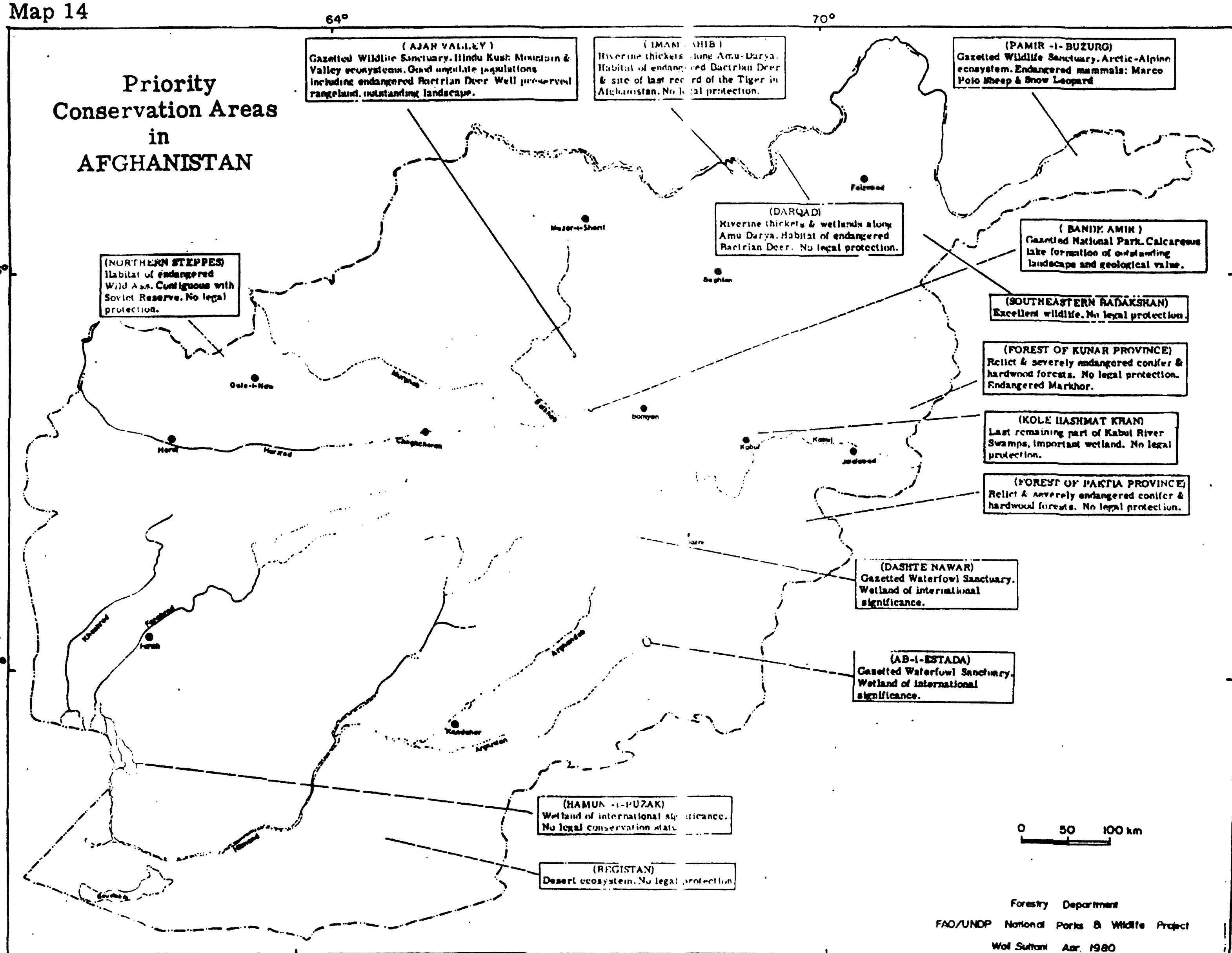
should be taken for lectures and discussions on conservation topics. The purpose and interest of the waterfowl sanctuary could be explained and its main features pointed out. Plans for such a visitor centre have been prepared and if the problems of jurisdiction over the area can be solved the World Wildlife Fund have indicated their willingness to finance the building.

4.9 TOURISM

The fascinating historical and cultural sites, magnificent landscapes and rich wildlife of Afghanistan constitute a major attraction for international tourists. Receipts from tourism amounted to US$ 12 million in 1975/76, about 4% of total current account receipts. Revenue had increased to US$ 28 million by 1978. The number of tourist arrivals rose from 38 000 in 1967/68 to 113 000 in 1971/72 and has since stabilized at about 90 000. The failure of the industry to expand is due to lack of amenities and poor organization. Afghanistan has only one hotel of international standard and that is situated in Kabul. There is little tourist quality accommodation near the major tourist destinations. Domestic transportation by land and air is unreliable and the service of poor quality. There is undoubted growth potential in the tourist sector and a World Bank study has identified some investment possibilities, initially in a training centre and ultimately in expansion of the hotel capacity. These plans have been delayed by recent political events. In the medium and long term tourism is likely to make a major contribution to the Afghan economy and visits to natural sites will be an important part of tourist itineraries.

The Afghan Tourist Organization maintains facilities in the Ajar valley, the Pamirs and Band-i-Amir, all areas where physical management is under the control of the Department of Forests and Range. The relative weakness of the latter Department and the strength of the ATO has led in some instances to the ATO assuming a degree of responsibility for the physical management of the wildlife resources of these areas. This is not satisfactory, as it may lead to conservation needs taking second place to the economic demands of tourism. It is therefore strongly recommended that a clear distinction be maintained between the responsibilities of the two organizations; those of the ATO should be limited to the transport and accommodation of visitors and related promotional activities and those of the Department of Forests and Range to resource and infrastructural management and interpretation and control of entry. Particularly in the Ajar valley, the confusion over jurisdiction has retarded the development of the area. A protocol agreement exists between the ATO and the Department of Forests and Range relative to the management of hunting programmes. This stipulates that the organization of the hunt shall be conducted by ATO but that quotas, seasons, hunting methods and areas and other wildlife management activities shall be the responsibility of the Department of Forests and Range.

Map 14



Priority Conservation Areas in AFGHANISTAN
64°
70°
36°
32°
(AJAN VALLEY)
Gazetted Wildlife Sanctuary. Hindu Kush Mountain & Valley ecosystems. Good ungulate populations including endangered Bactrian Deer. Well preserved rangeland, outstanding landscape.
(IMAM SAHIB)
Riverine thickets along Amu-Darya. Habitat of endangered Bactrian Deer & site of last record of the Tiger in Afghanistan. No legal protection.
(PAMIR -I- BUZURG)
Gazetted Wildlife Sanctuary. Arctic-Alpine ecosystem. Endangered mammals: Marco Polo Sheep & Snow Leopard
(DARQAD)
Riverine thickets & wetlands along Amu Darya. Habitat of endangered Bactrian Deer. No legal protection.
(BANDE AMIR)
Gazetted National Park. Calcareous lake formation of outstanding landscape and geological value.
(NORTHERN STEPPES)
Habitat of endangered Wild Ass. Contiguous with Soviet Reserve. No legal protection.
(SOUTHEASTERN BADAKSHAN)
Excellent wildlife. No legal protection.
(FOREST OF KUNAR PROVINCE)
Relict & severely endangered conifer & hardwood forests. No legal protection. Endangered Markhor.
(KOLE HASHMAT KHAN)
Last remaining part of Kabul River Swamps, important wetland. No legal protection.
(FOREST OF PAKTIA PROVINCE)
Relict & severely endangered conifer & hardwood forests. No legal protection.
(DASHTE NAWAR)
Gazetted Waterfowl Sanctuary. Wetland of international significance.
(AB-I-ESTADA)
Gazetted Waterfowl Sanctuary. Wetland of international significance.
(HAMUN -I-PUZAK)
Wetland of international significance. No legal conservation status
(REGISTAN)
Desert ecosystem. No legal protection
Kabul
Herat
Kandahar
0 50 100 km
Forestry Department
FAO/UNDP National Parks & Wildlife Project
Wali Sultani Apr. 1980

I. TOURISM

Afghanistan has fascinating historical and natural sites, magnificent landscapes and rich wildlife. These form major attractions for international tourism. However, little quality accommodation is available near major tourist destinations. In the medium and long term tourism is likely to make a major contribution to the Afghan economy and visits to National Parks will be an important part of tourist itineraries.

Recommendations

- The Department of Forest and Range should cooperate with the Afghan Tourist Organization in developing nature-orientated tourism.

- Set up a series of well-managed National Parks, initially in the Ajar Valley, Ab-i-Estada and Bande Amir.

- A clear distinction should be maintained between the responsibilities of the two organizations dealing with nature-tourism. The Department of Forest and Range should be responsible for the resource and infrastructural management and the control of entry, whereas the Afghan Tourist Organization should be responsible for transport and accommodation of visitors and promotion.

J. CONSERVATION AND MANAGEMENT OF NATURAL CONSERVATION SITES

At the moment several potential nature conservation sites have been surveyed and a few of the most important have been gazetted. There is no physical development, no boundary demarcation or construction of guard posts and no well-trained guards have been appointed.

Recommendations

- Establish a series of National Parks, Nature Reserves and Game Management Reserves representing all ecosystems of Afghanistan.

- Make the conservation and management of the national conservation sites the sole responsibility of the Department of Forest and Range.

- Gazette all natural conservation sites, and prepare management plans for them. Establish boundaries and demarcate them in the field. Train guards and equip and house them.

- Give priority to pilot programmes in National Park Management in the Ajar Valley, Ab-i-Estada and Bande Amir.

- Potential National Park sites are Ajar Valley, Ab-i-Estada, Bande Amir, Pamir, Hamun-i-Puzak and Nuristan.

- Potential Nature Reserve sites are Kole Hashmat Khan, Dashte Nawar, Darqad and Emam Sahib.

- Potential Game Management sites are areas surrounding national parks in the Pamir, Ajar Valley and Nuristan.

- Areas to be surveyed are Registan, northwestern Afghanistan (wild ass area), the Salang Pass, Hamun-i-Saberi and southern Badakhshan.

5. INVENTORY OF SITES, ACTION PLAN

5.1 SELECTION OF NATURAL SITES, CRITERIA

The selection of conservation areas should be based on the following principles:

(a) Uniqueness. Areas having very special or unique features should be protected as a matter of priority. Only those uses compatible with their preservation should be permitted. They should be protected for their potential use for scientific research, recreation or as sources of unusual genetic material.

(b) Representativeness. One or more areas should be set aside within each of the different ecosystems in each of the biogeographical provinces (see Section 2.2.1). Priority should be given to wetlands and forests.

(c) Diversity and heterogeneity. The areas chosen should exhibit most of the essential features of the type of ecosystem that they are designed to protect. They should be rich in species. Vegetation is strongly influenced by the physical environment. Areas selected for protection should therefore include a maximum range of altitudes, aspect and geology.

(d) Size. The areas should be of sufficient size to safeguard all the ecosystems or all the critical habitats of the species concerned and where possible should include a buffer zone. As far as possible areas should not be divided and boundaries should be as short as possible.

5.2 NATURAL SITES AND ACTION PLANS

5.2.1 Big Pamir

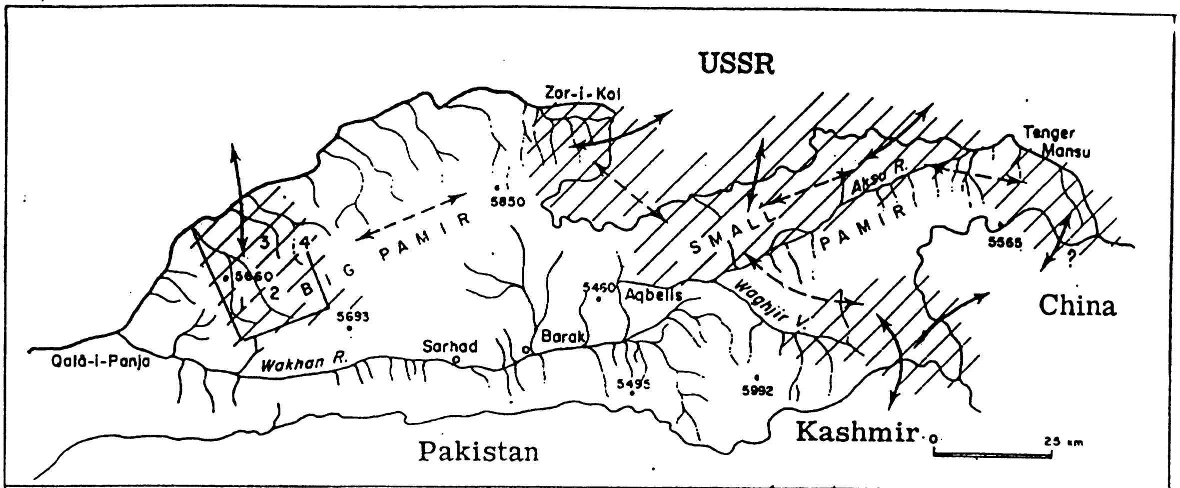
Name: Pamir-i-Buzurg (Big Pamir)

Designation: At present designated as a wildlife sanctuary but the area merits promotion to national park status and could be proposed as a World Heritage Site.

Location: Badakhshan Province, approximately 250 km to the east of Fayzabad (73°E, 37°10'N). Access from Kabul (7 days) via Kunduz and Fayzabad to Zebak then to Qala-i-Pandja and by horse and yak to the Big Pamir. Map 15 a, b.

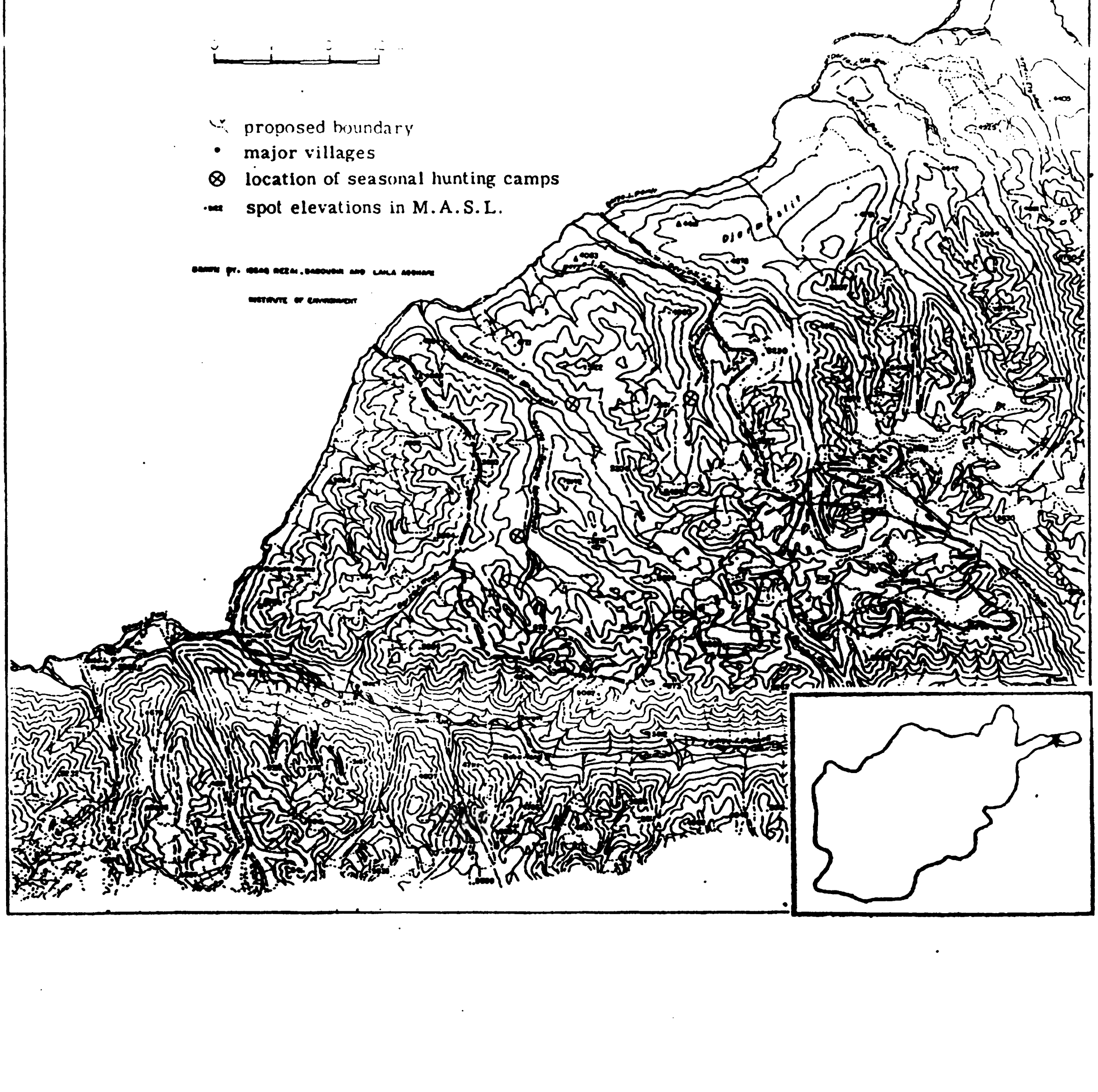
Area: 67 938 ha.

Map 15a PAMIR and WÁKHAN CORRIDOR



Map 15b

Big Pamir Wildlife Reserve



Environment: Mountainous country with many glaciers and mountain lakes. Elevations are between 3 250 and 6 103 m. The mountains are bare or covered with a dry alpine steppe vegetation, with grasses and sedges in the valleys. On the flat table-land and ridges an alpine heath vegetation is found with Ericaceae, many grasses and Primula macrophylla.

The Pamirs are well-known for the Marco Polo sheep (Ovis ammon poloi). The estimated Afghan population is more than 2 000 (in the Big and Small Pamir) of which approximately 750 are in the Big Pamir (Petocz, 1978). Marco Polo sheep occur in the adjacent mountain ranges of the Soviet Union, China and Pakistan and some migration across the international frontiers occurs.

Ibex (Capra ibex sibericus), hare (Lepus capensis), a variety of rodents such as the long-tailed marmot (Marmota caudata) and vole are common. Brown bear (Ursus arctos), wolf (Canis lupus), lynx (Felis lynx) and the endangered snow leopard (Panthera uncia) also occur.

Ninety-six species of birds have been recorded. They include the rare bar-headed goose (Anser indicus) which breeds near the lakes, and cranes (Grus grus). The lammergeier (Gypaetus barbatus), Egyptian vulture (Neophron perenopterus) and griffon vulture (Gyps fulvus) are common.

Status: Gazetted as Wildlife Sanctuary on 10 September 1978.

Value: The Pamirs are one of the most exciting landscapes of Central Asia. Mountains rise above 7 000 m, there are beautiful rivers and lakes. Two ethnic groups, the Wakhis and the Kirghiz, still lead a traditional pastoral life. Archaeological sites include petroglyphs and graves.

The present Pamir-i-Buzurg Wildlife Sanctuary should be extended and designated a National Park and World Heritage Site.

Conservation problems: Domestic stock, which compete with Marco Polo sheep for fodder, and uncontrolled hunting may be excessive. The trophy hunting programme maintained by the Afghan Tourist Organization is incompatible with national park status.

Action plan: The Big Pamir reserve should be extended and designated a national park. This should be surrounded by buffer zones managed for hunting. Boundaries should be demarcated to include the Sargaz, Tulibai, Mangulak and Abakhan valleys.

- Survey the adjacent areas to identify areas for the park extension.

- Survey the Small Pamir to identify potential park and reserve areas.

- Prepare a management plan based on 'Report on the Afghan Pamir', FO:DP/AFG/74/016, documents 5, 6 and 7 and on detailed socio-economic and ecological data.

- Station trained park staff in the reserve and provide them with housing, equipment and transport (e.g. yaks and Bactrian camels).

- Construct and maintain simple visitor facilities, both en route and on the park boundary. No buildings should be located inside the park.

- Draft regulations to control access and visitor activities.

- Monitor the range conditions and wildlife numbers, especially of Marco Polo sheep.

- Phase out grazing of domestic stock.

- Study the effects of the trophy hunting programme on the Marco Polo sheep and restrict hunting to wildlife management areas.

5.2.2 Ab-i-Estada

Name: Ab-i-Estada

Designation: Flamingo and waterfowl sanctuary but proposed as national park.

Location: Ghazni Province, approximately 130 km to the south of Ghazni town, 32°50'N and 67°80'E. Access to the area is from Kabul (4.5 hours by car) through Ghazni and Moqur to Korawaddin. Map 16.

Area: The lake surface and a proposed strip of land 2 km wide above high water level, approximately 27 000 ha.

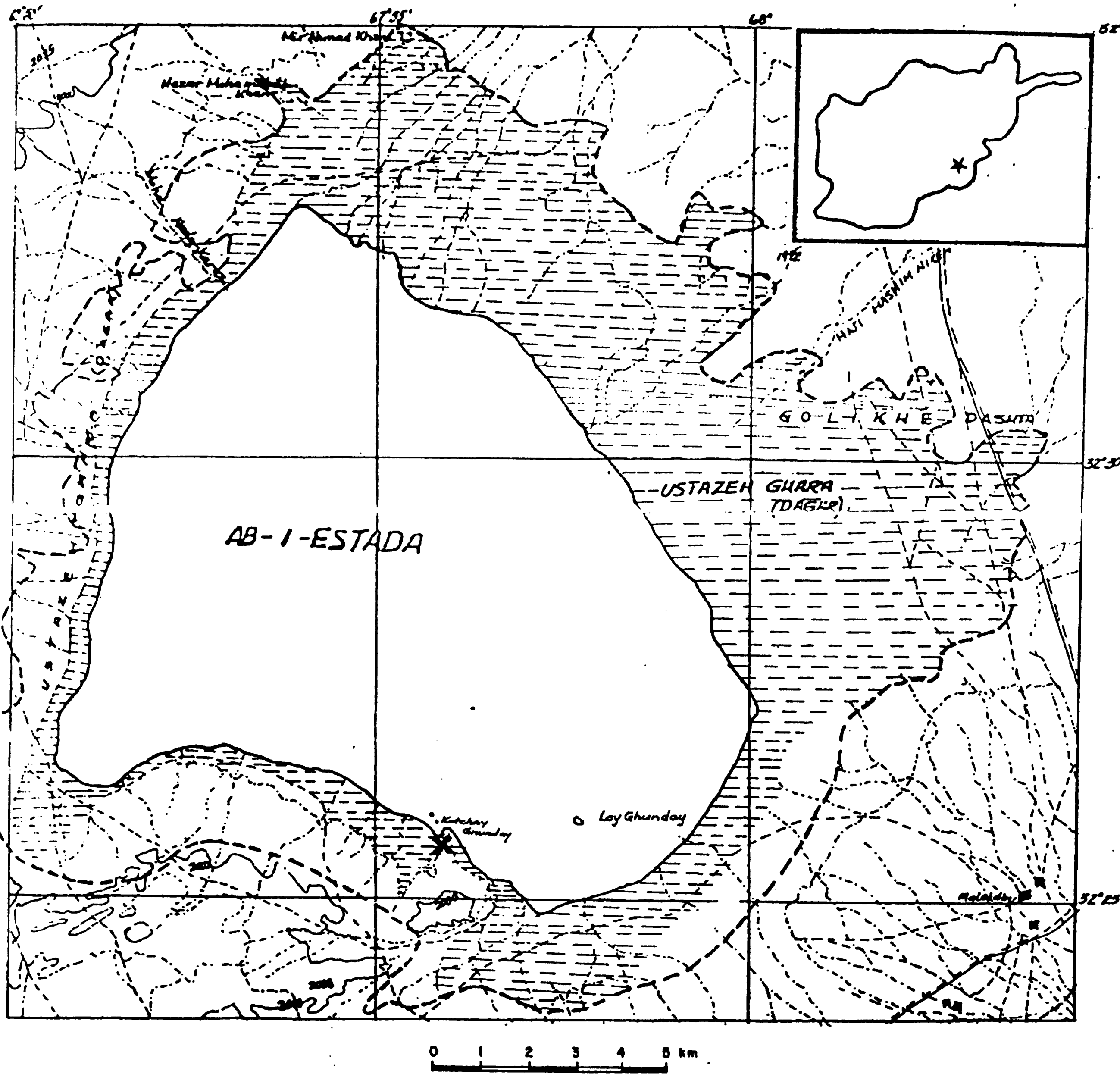
Environment: Ab-i-Estada is a large shallow alkaline lake. Its size varies seasonally. It is surrounded by mudflats and arid highland steppes, which are dominated by Amygdalis spp, Cousinia spp, Tamarix laxa and Artemisia spp. Grasses are common. The mudflats are bare with only a few Taraxacum monochlamydeum. The only aquatic vegetation is the pondweed (Ruppia maritima).

The lake is a very important resting and feeding site for migratory waterfowl. It is an important resting area for thousands of ducks and waders. The very rare Siberian crane (Grus leucogeranus) occurs on migration. There is a colony of up to 5 000 pairs of greater flamingo (Phoenicopterus ruber roseus). Small mammals are numerous in the steppes around the lake and there is one record of the marbled polecat (Vormela peregusna).

Status: Ab-i-Estada was declared a National Flamingo and Waterfowl Sanctuary on 6 June 1977.

Conservation value: In 1970 the International Conference on Conservation of Waterfowl and Wetlands, meeting in Ramsar, Iran, stressed the importance of Ab-i-Estada and Dashte Nawar for migrating waterfowl and for the conservation of the greater flamingo.

Map 16



Ab-i-Estada Flamingo and Waterfowl Sanctuary. **Heavy dotted line indicates boundary. Tentative site for warden accommodation indicated by large X.**

There is extensive grazing of domestic stock on the lake shores, which destroys the vegetation and disturbs the waterfowl. Egg collecting, disturbance during the breeding season and hunting throughout the year are significant problems.

The greatest problem, however, is caused by irrigation projects on the Ghazni and Gardez rivers, which flow into the lake. These decrease the volume of water in the lake and increase its salinity.

Action plan:
- Gazette Ab-i-Estada as a national park.
- Develop the park according to the recommendations of the 'Management Plan for Ab-i-Estada and Dashte Nawar Flamingo and Waterfowl Sanctuary' (FO:DP/AFG/74/016).
- Settle and demarcate boundaries. Signposts in Pushtu and Russian should be placed at strategic places to inform people of the status of the area.
- Station trained park staff, initially six men, in the area and provide housing, uniforms and horses or motorcycles.
- Develop research facilities and initiate research on hydrology and ecology, population trends and habitat requirements of the flamingos, cranes and other waterfowl, range ecology and archaeology.
- Fence an area of the lake shore and protect it against grazing.
- Develop restricted visitor facilities and interpretation programmes.

5.2.3 Ajar Valley

Name: Dara-i-Ajar (Ajar valley)

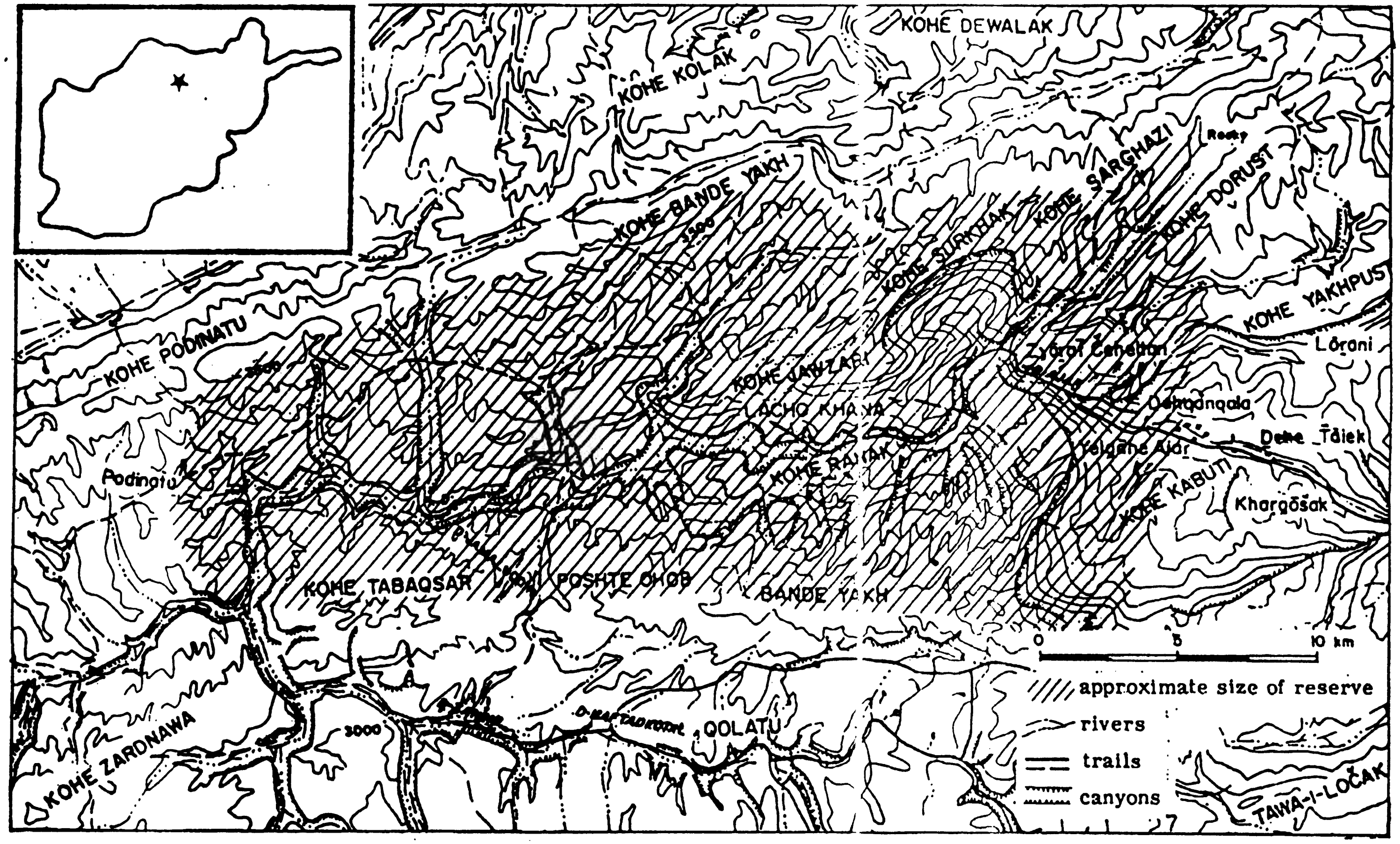
Designation: At present a wildlife sanctuary but proposed as a national park.

Location: Bamyan Province, 55 km to the northwest of the town Bamyan, 67°37'E, 36°40'N. Access to the area is from Kabul (10 hours by all-terrain vehicle) through Charikar, Doab and Karmard. Map 17.

Area: 40 000 ha.

Environment: The Ajar valley is at an elevation of 1 800-3 800 m along the Ajar river. The river has eroded its way through the soft limestones and formed a narrow, twisted canyon. Part of the river is subterranean. Exposed geological strata are coloured red, green and black. The river banks have a Tugai vegetation with *Salix* spp, *Tamarix* spp, and many herbaceous plants. Gradually on the slopes the vegetation becomes drier with an *Ephedra* steppe community. At higher altitudes this is replaced

Map 17 AJAR VALLEY WILDLIFE RESERVE



by Zygophyllum and Acantholimon steppe. In depressions and at higher elevations a Carex stenophylla meadow community is found. This is an important grazing area for ibex (Capra ibex) and urial (Ovis orientalis). Bactrian deer (Cervus elaphus bactrianus) have been introduced and number about 42. Seventy feral yaks (Bos grunniens) are present. Major carnivores are snow leopard (Panthera uncia), leopard (Panthera pardus), lynx (Felis lynx), wolf (Canis lupus) and jackal (Canis aureus). Sixty bird species have been identified so far.

Status: The Ajar valley was established as a wildlife sanctuary on 10 September 1978.

Value: The area was protected for many years as a hunting reserve by the former king. Grazing by domestic animals was prevented. The area in and around the Ajar valley contains some of the most beautiful scenery to be found in this part of Asia. It already has a splendid lodge with its own water-powered electric generator.

Conservation problems: Parts of the reserve are occupied by cropland; some livestock are now grazed within the reserve boundaries and compete with the wildlife for grazing. There is some illegal hunting.

Action plan:

- Establish jurisdiction and control of the site and gazette it as a national park.

- Prepare a detailed management plan, based on ecological and socio-economic background data and the 'Preliminary Management Plan for the Ajar Valley Wildlife Reserve', FO:DP/AFG/74/016, 1977.

- Establish boundaries and demarcate them clearly in the field.

- Place signposts near the entrance and where major trails enter the reserve.

- Station trained park staff around the reserve and provide them with adequate housing and equipment and prepare work plans.

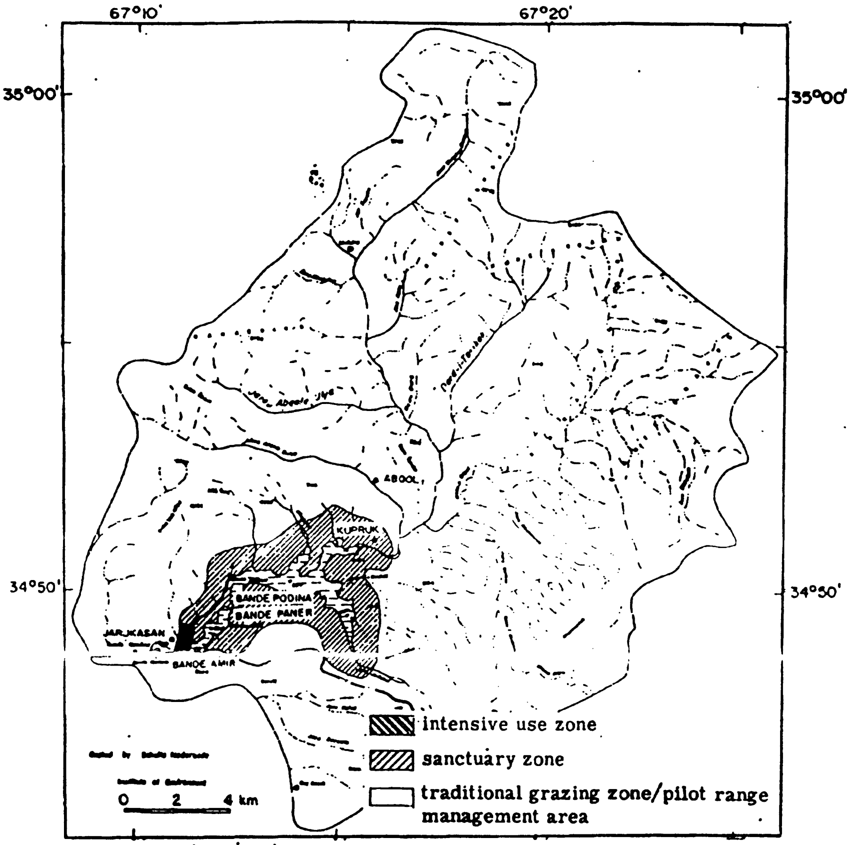
- Phase out farming and stop illegal grazing and hunting.

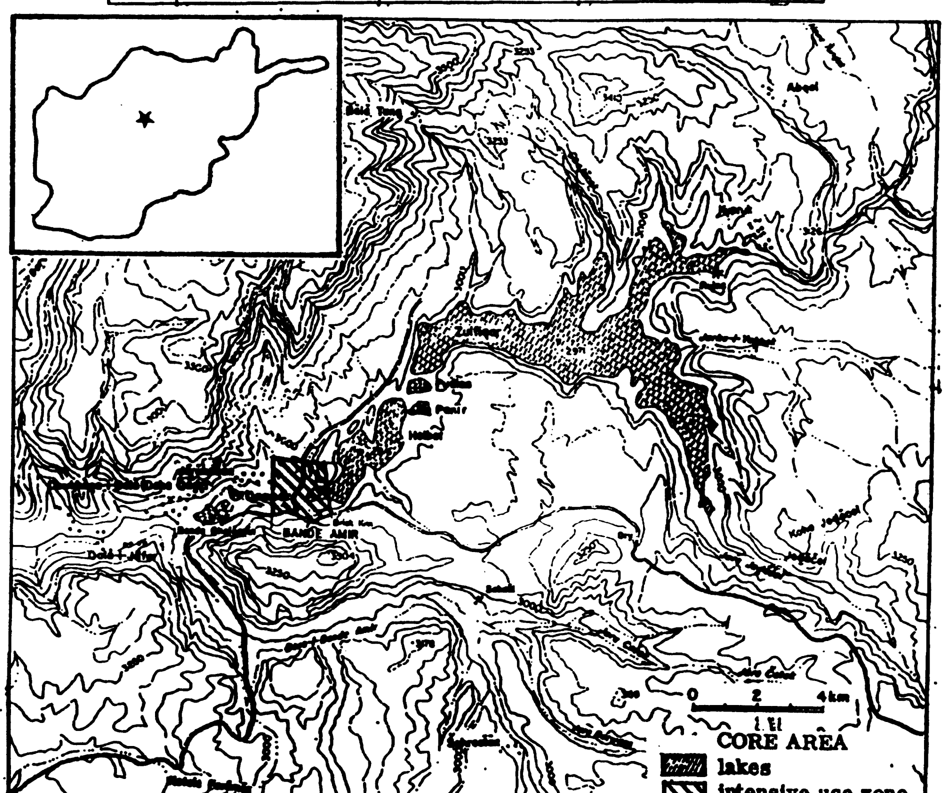
- Monitor population trends and range-use of the major species, especially ibex, urial and Bactrian deer.

- Limit the number of feral yaks.

- Develop restricted tourism and provide information leaflets and guides for the visitors.

Map 18 BANDE AMIR NATIONAL PARK





5.2.4 **Bande Amir**

Name: Bande Amir

Designation: National park.

Location: Bamyan Province, 60 km west of the Bamyan townsite, 34°52'N, 67°10'E. Access to the area from Kabul is via Bamyan (8.5 hours by car). Map 18.

Area: The Bande Amir watershed, 41 000 ha.

Environment: Bande Amir is a chain of six lakes inter-connected by calcium carbonate dams. The water is an intense blue which contrasts sharply with the surrounding high steppes of the central Hindu Kush. The altitude of the lakes is approximately 2 900 m. The Bande Pudima lake is shallow and completely covered with reeds (*Phragmites australis*). Its surroundings have a vegetation of willows (*Salix* spp) and mint (*Mentha longifolia*). A poor, open *Acantholimon* community covers the surrounding steppes but in the spring many tulips (*Tulipa* spp), wild onions (*Allium* spp), gagel (*Gagea* spp) and buttercups (*Ranunculus* spp) colour the steppes.

The degraded steppes have a poor fauna. Urial (*Ovis orientalis*), ibex (*Capra ibex*) and wolf (*Canis lupus*) occur. About 45 species of birds have been recorded.

Status: On 30 September 1973 Bande Amir was declared a national park but it still has not been officially gazetted by the Government. Nothing has been done to develop the area and it does not fulfil the international standards of a national park as defined by IUCN.

Value: The lakes are one of Afghanistan's most outstanding scenic attractions and therefore are visited by thousands of people annually.

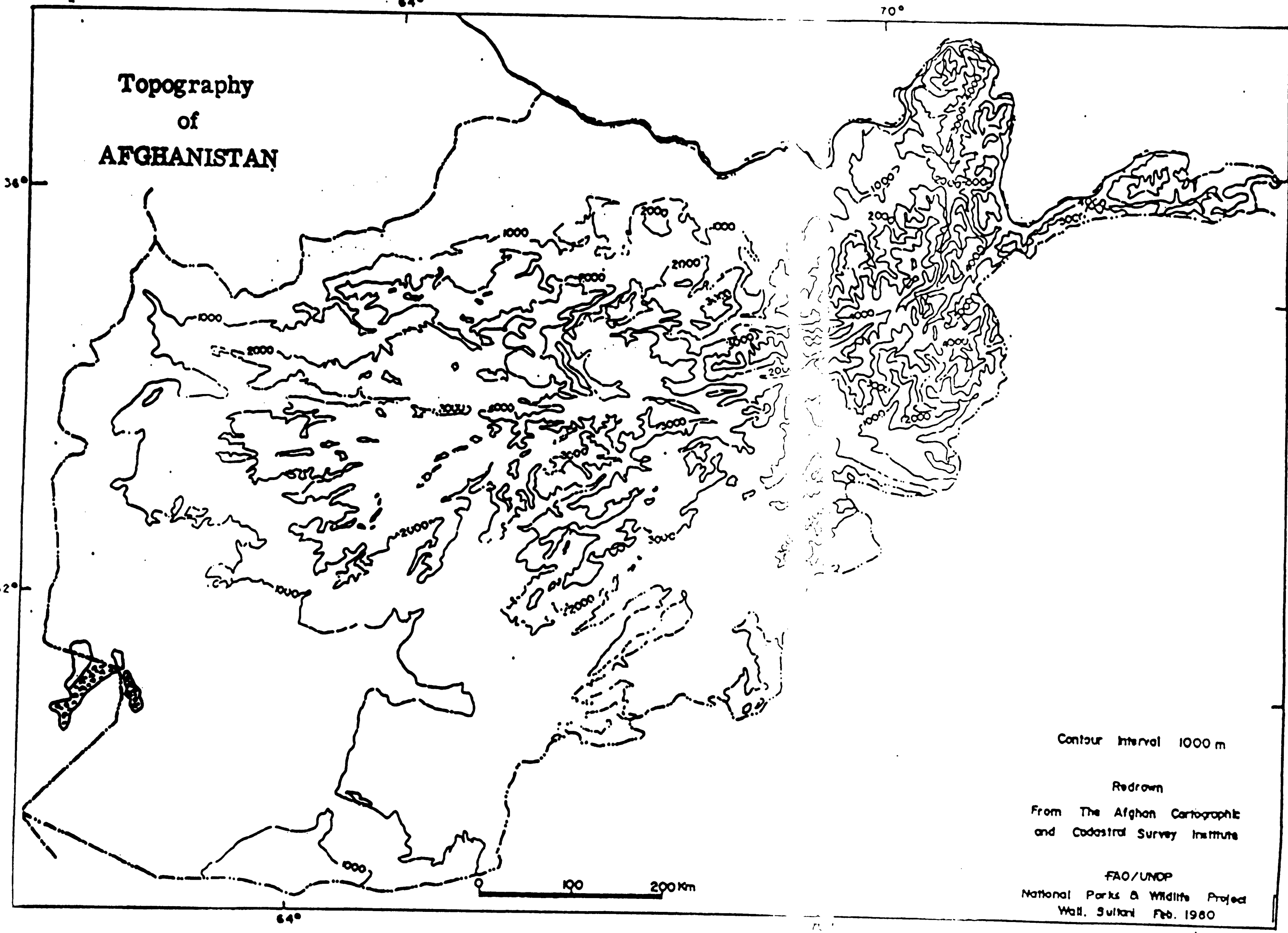
Conservation problems: The poor visitor facilities in the area detract from the beauty of the park. Unlimited grazing and uprooting of the shrubs has resulted in range degradation and serious soil erosion. Excessive cultivation occurs within the area.

The reeds are harvested and grazed thus destroying waterfowl nesting habitat.

Action plan:

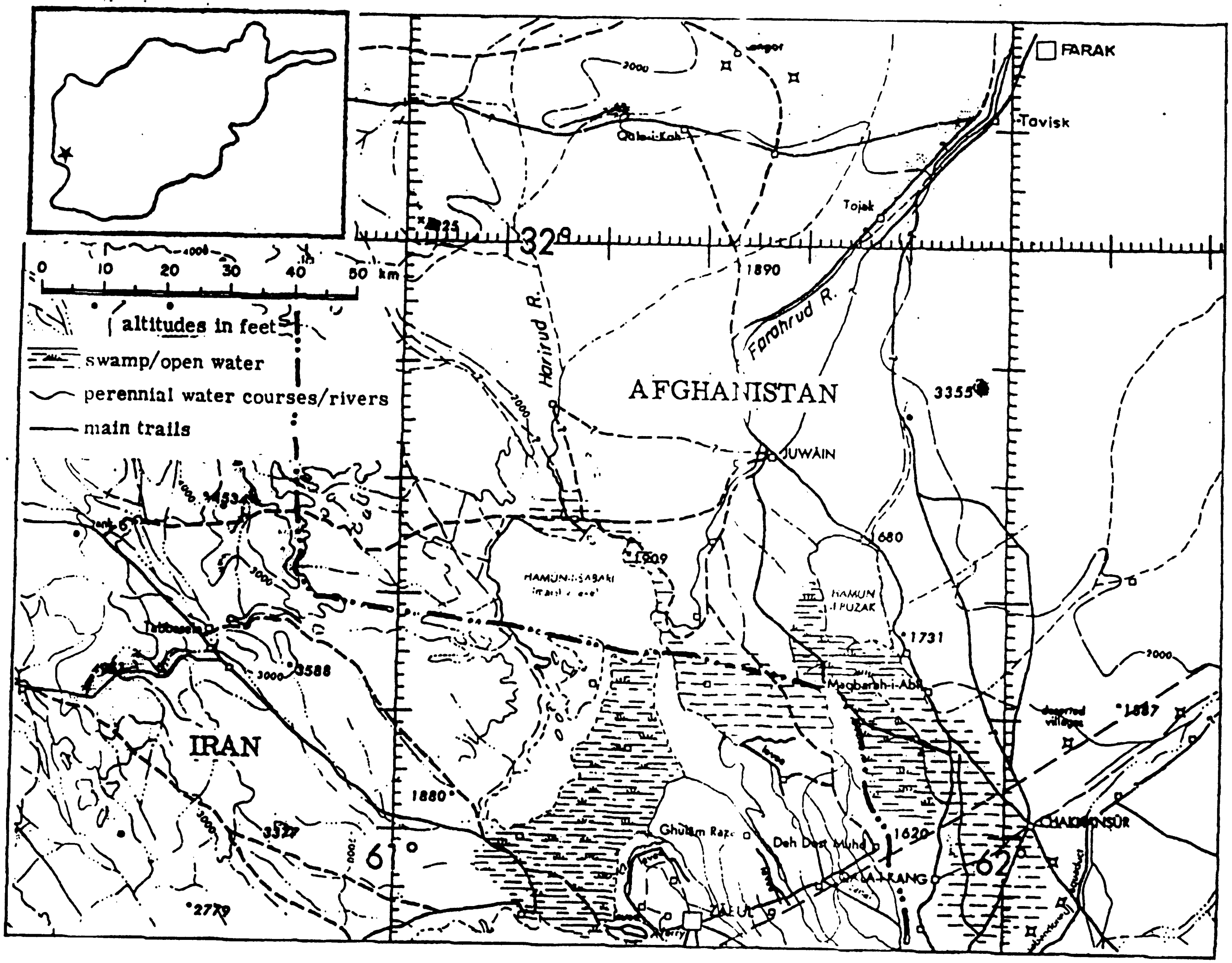
- Gazette Bande Amir as a national park.
- Prepare a detailed management plan based on the 'Strategy for the establishment and development of Bande Amir National Park' (Field Document 8, FO:DP/AFG/74/016), and extensive knowledge of the behaviour of visitors and the activities of local inhabitants of the area.
- Place park management and protection under the responsibility of the Department of Forests and Range.
- Draft park entry regulations and charge an entrance fee.

Map 1


Topography
of
AFGHANISTAN
64°
70°
36°
32°
Contour interval 1000 m
Redrawn
From The Afghan Cartographic
and Cadastral Survey Institute
FAO/UNDP
National Parks & Wildlife Project
Wali. Sultani Feb. 1960
0 100 200 Km

Map 19 Hamun-i-Puzak and Hamun-i-Saberi Lakes

Important waterfowl areas



- Initially appoint four well-trained and uniformed park staff.

- Survey boundaries and demarcate them clearly in the field.

- Construct an entrance gate and signposts.

- Locate all visitor accommodation outside the park in a special visitor development area, preferably Darya-i-Gumud.

- Prohibit all hunting and fishing within the park and phase out all use not compatible with national park status.

5.2.5 Hamun-i-Puzak

Name: Hamun-i-Puzak.

Designation: None, proposed as a national park.

Location: Nimroz Province, $31^{\circ}30'$N, $61^{\circ}45'$E. Access to the area is from Kabul through Kandahar, Farah and Lasojoyayn. The last part from Farah is 4 hours by heavy four wheel drive vehicle. Map 19.

Area: About 35 000 ha.

Environment: Hamun-i-Puzak is a large shallow permanent lake, in the flat Seistan basin. It derives its water from the Khashrud and Helmand rivers. The lake and borders are covered with 2-3 m high reed beds (*Phragmites australis*). There are many algae in the open parts. The surrounding semi-deserts have an open shrubby *Tamarix-Artemisia* community. Large numbers of migratory waterfowl use the lake. In January 1976 357 000 birds were counted and 98 bird species have been identified so far. Wild boar (*Sus scrofa*), foxes, jackal (*Canis aureus*), wolf (*C. lupus*) and hyaena (*Hyaena hyaena*) are common.

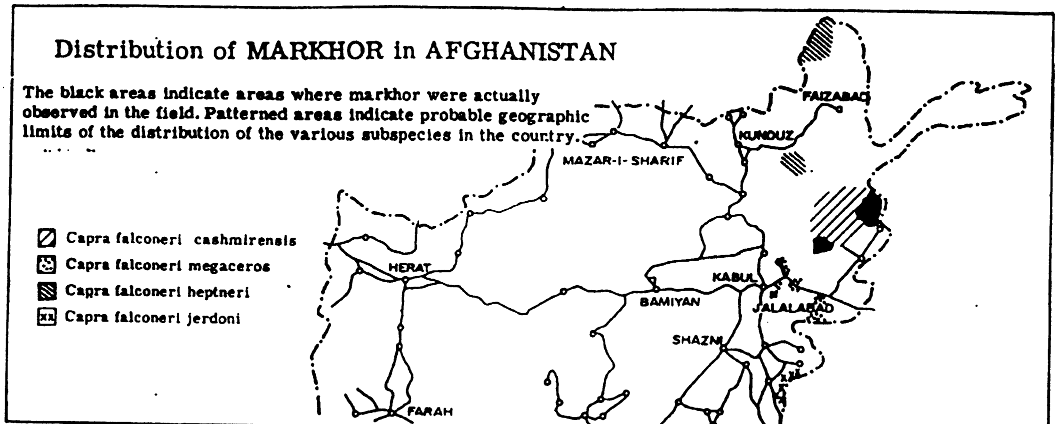
Status: The area is government-owned but local people have the right to collect natural produce.

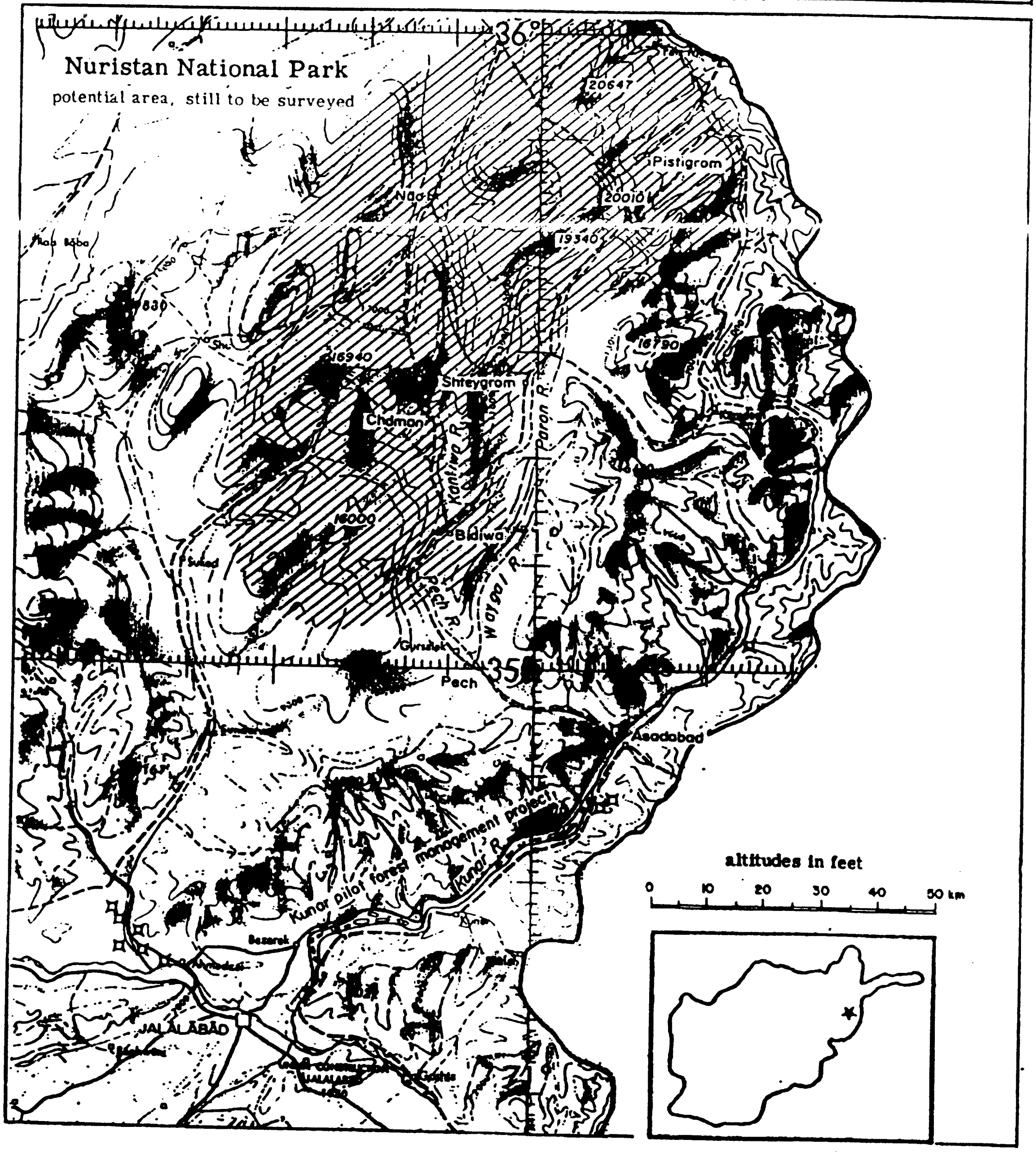
Value: Hamun-i-Puzak is one of the most important wetlands of Afghanistan. It has the largest numbers of migrating waterfowl.

Conservation problems: There are several small villages around the lake with a total population not exceeding 1 000 people. These people are dependent on the lake's natural resources such as reeds, fish and waterfowl. The latter are extensively hunted. Reeds are used for fodder, fuel and for the construction of houses and small boats.

Probably the greatest problem is the quantity and quality of the water supply. The large irrigation projects in the Helmand and Khashrud rivers have deprived the area of much of its water.

Map 20


Distribution of MARKHOR in AFGHANISTAN
The black areas indicate areas where markhor were actually observed in the field. Patterned areas indicate probable geographic limits of the distribution of the various subspecies in the country.
Capra falconeri cashmirensis
Capra falconeri megaceros
Capra falconeri heptneri
Capra falconeri jerdoni
FAIZABAD
KUNDUZ
MAZAR-I-SHARIF
HERAT
KABUL
BAMIYAN
JALALABAD
SHAZNI
FARAH


Nuristan National Park
potential area, still to be surveyed
36°
20647
Pistigrom
20010
19340
16790
16940
Shteygrom
Chaman
16000
Bidiwa
Pech R.
Waigal R.
Paron R.
35
Pech
Asadabad
Kunar pilot forest management project
Kunar R.
JALALABAD
altitudes in feet
0 10 20 30 40 50 km

Action plan:

- Gazette Hamun-i-Puzak as a national park.
- Prepare a preliminary management plan, based on hydro-ecological and socio-economic background data. Define boundaries, regulate use of the lake resources by local people.
- Station two park staff, provided with housing and equipment, in the area.
- Study the quality and quantity of the water supply.
- Study the relationship of the local population to the marshland.
- Monitor numbers, species composition and habitat requirements of waterfowl and other wildlife.
- Survey the neighbouring Hamun-i-Saberi lake and study its potential as a nature conservation site.

5.2.6 Nuristan

Name: Nuristan.

Designation: National park/nature reserve.

Location: Kunar and Laghman Provinces, 35°15'N, 70°45'E, in the mountains to the north of Asadabad. Access through Jalalabad, Asadabad and Pech. Map 20.

Area: Not yet determined.

Environment: Nuristan is mountainous with peaks up to 6 300 m. It consists of a variety of geological formations, mainly granite, chorite and grano-chorites. Due to the frequent summer rains the area is forested and the vegetation ranges from evergreen forest to alpine grasslands and glaciers. The human population is sparse especially in the narrow and steep upper valleys of the Paron and Kantiwa rivers. The lower valleys have walnut (Juglans regia) and birch (Betula spp) forests and thickets and valley-meadows. Between 1 500 and 2 500-2 900 m there is oak forest (Quercus) in drier places dominated by Q. baloot and Q. semecarpifolia and in more humid places by Q. dilatata. Above this belt up to the tree-line at 3 300 m lies a coniferous forest belt with cedar (Cedrus deodara), spruce and fir (Picea smithiana and Abies webbiana), pine forest (Pinus gerardiana) and juniper forest (Juniperus seravschanica). This forest has been heavily cut over. Above the forests there is alpine shrubland dominated by rhododendron (R. collettianum) and dwarf juniper (J. nana), alpine heath and alpine meadowland, which provides very good summer grazing.

These very varied habitats have a rich fauna including the rare markhor (Capra falconeri), ibex (Ibex ibex), urial (Ovis orientalis), the endangered black bear (Selenarctos thibetanus)

and brown bear (Ursus arctos), snow leopard (Panthera uncia) and leopard (Panthera pardus), lynx (Felis lynx) and wolves (Canis lupus).

Oriental mammals such as musk deer (Moschus moschiferus), rhesus monkey (Macaca mulatta), flying squirrels (Petaurista petaurista and Hylopetes fimbriatus) and yellow-throated marten (Martes flavigula) have their westernmost extension here.

Eighty-eight bird species were recorded during the 1977 FAO survey.

Status: Forest and rangeland without special status.

Value: Laghman and Kunar have the least disturbed forests of Afghanistan. These forests are species-rich ecosystems. Spectacular large mammals, which are elsewhere endangered or very rare, include markhor, leopard, snow leopard and Himalayan black bear. Hunting pressure is becoming heavier and the numbers of markhor have decreased in recent years. The traditional way of life and types of houses in the region are of great cultural interest and should be conserved.

Action plan: Field survey to determine the best area for the establishment of a national park. It should include large areas of relatively undisturbed walnut, oak, cedar, spruce and fir and juniper forest and should represent all ecosystems. A priority area should be the upper valley of the Pech and Waygal rivers with their tributaries. Laghman should also be surveyed.

- Station a wildlife ecologist and two park staff in the area and collect the data for a management plan.

- Determine and demarcate boundaries as soon as possible.

- Prepare a preliminary management plan based on ecological and socio-economic data.

- Initially impose few restrictions on the local inhabitants. Ban hunting of the endangered markhor, leopard, snow leopard and Himalayan black bear. Stop logging the forests for commercial purposes.

- Employ local people as park staff to secure their maximum participation and cooperation.

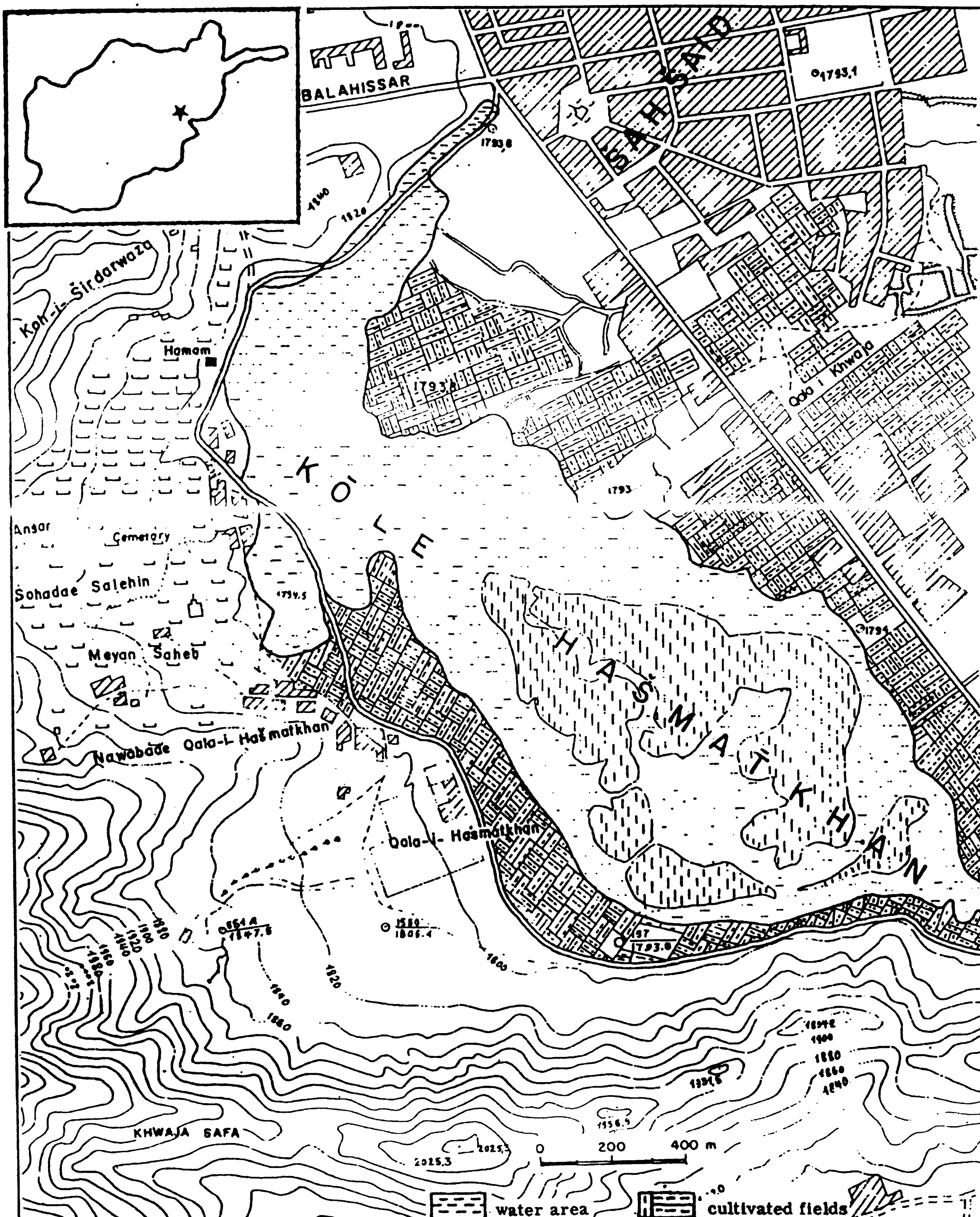
5.2.7 Kole Hashmat Khan

Name: Kole Hashmat Khan.

Designation: Wildlife sanctuary.

Location: Kabul Province, situated on the southeastern outskirts of the town of Kabul, just to the south of the Kabul Gardez Highway, 34°30'N, 69°12'E. Map 21.

Map 21 MAP OF LAKE HASHMAT KHAN



Area: Approximately 191 ha.

Environment: The Kole Hashmat Khan lake is the only remaining part of the extensive wetlands which once existed in the Kabul valley. The Kole Hashmat Khan lake itself, situated at an elevation of 1 792 m, used to be much larger, receiving its water directly from the Logar river. At present most of the water is used for irrigation and the lake only receives water in winter and spring. It is slightly saline. About half of the lake is covered with high reeds (Phragmites australis). The open water has abundant algae, Utricularia and Ranunculus species. The grassy shores are heavily grazed. Adjacent to the meadows are wheat fields and dry steppe communities on the heavily over-grazed and eroded mountains. Although several bird species breed in the lake, its main importance is for migrating waterfowl. Thousands of ducks, coots and waders have been recorded. Greater flamingo (Phoenicopterus ruber roseus), spoonbills (Platalea leucorodia), glossy ibis (Plegadis falcinellis) and pelicans (Pelicanus onocrotalus) have also been seen. Voles, jackals (Canis aureus) and red fox (Vulpes vulpes) are reported from the lake surrounds and toads (Bufo viridis) and frogs (Rana spp) are common.

Status: In the thirties King Mohammed Zahir Shah declared the lake a waterfowl reserve and it was protected by the royal garrison. Since 1973 the lake has been under the protection of the Republican Guard, and only a few prominent persons have been allowed to hunt. In 1978 it was put under the Department of Forests and Range but effective control is still with the Republican Guard. The areas to the south are owned by the Public Bath, to the north by local residents. The surrounding mountains are under the Department of Forests and Range.

Value: Kole Hashmat Khan is the last remaining part of the former extensive wetlands in the Kabul valley and remains a relatively undisturbed ecosystem. It attracts large numbers of migratory and breeding waterfowl and the shores form an important recreational and religious site for the people of Kabul.

Conservation problems: The lake's ecology is much influenced by the dense population surrounding it. The water of the Logar river is polluted. Domestic animals graze the reeds whenever the water level is low and disturb the waterfowl. Reeds are cut and birds hunted. The shore is used as a children's playground and for laundry.

Action plan:

- Establish jurisdiction and control of the site.

- Provide adequate housing and equipment and prepare detailed work programmes for the protection personnel and ensure the total protection of the flora and fauna of the area.

- Acquire areas of the shoreline and plant indigenous trees to improve the wildlife habitat and landscape of the lake's surroundings.

- Monitor waterfowl numbers, water levels and weather conditions and prepare monthly reports.

5.2.8 Dashte Nawar

Name: Dashte Nawar.

Designation: Flamingo and waterfowl sanctuary (nature reserve).

Location: Ghazni Province, 55 km to the northwest of the Ghazni townsite, 33°35'N, 67°45'E. Access to Dashte Nawar is from Kabul through Ghazni and Nawar (5 hours by four-wheel drive vehicle). Only accessible in summer. Map 22.

Area: The lake surface and a belt of land 1 km wide above high water level. Approximately 7 500 ha.

Environment: Dashte Nawar is a high desert plain in the Kohe Baba Range of the Hindu Kush. It contains a perennial alkaline lake, Ab-i-Nawar, with numerous small islands and mud flats. The lake receives its water from a small river. The plain is covered with a highland steppe, rich in grasses, such as *Bromus*, *Puccinellia* and *Aeluropus*, and herbaceous plants. The surrounding steep mountains support an open *Acantholimon* steppe community. The lake itself has a dense cover of algae. Some herbaceous plants such as *Glaux maritima*, *Crypsis aculeata* and *Polygonum sibericum* grow on the mud flats. Dashte Nawar is the world's highest breeding area of the greater flamingo (*Phoenicopterus ruber roseus*) (3 200 m). Avocet, redshank, greater sandplover and common tern breed on the islands. Thousands of ducks, waders and other waterfowl visit Dashte Nawar on migration.

Mammals are represented by the high steppe rodents such as the ground squirrel (*Citellus fulvus*) and the long-tailed marmot (*Marmota caudata*). Wolf (*Canis lupus*) and jackal (*C. aureus*) are also common.

Status: On 6 June 1977 Dashte Nawar was declared a National Flamingo and Waterfowl Sanctuary.

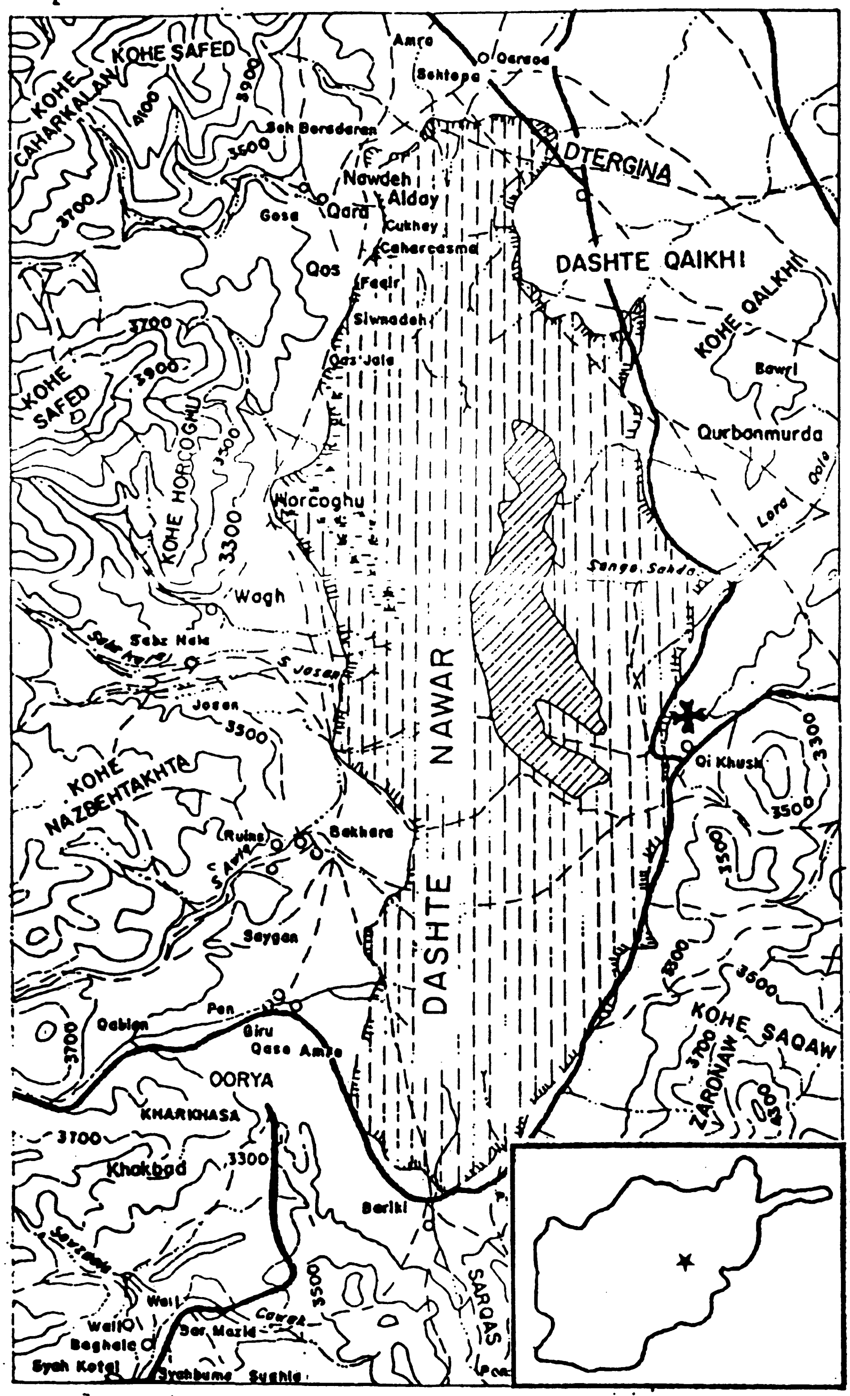
Value: In 1970 the International Conference on Conservation of Waterfowl and Wetlands, held in Ramsar, Iran, emphasized the importance of Dashte Nawar and Ab-i-Estada as waterfowl sanctuaries and breeding places of the greater flamingo. Large numbers of waterfowl from the Kazakhstan (Siberia)-Pakistan-India population stop over at the lakes during their migrations.

Conservation problems: The area is difficult to reach. It forms a major summer grazing range for the domestic stock of the nomads. Egg and nest disturbance will be a problem.

Action plan:

- Establish boundaries and demarcate them clearly.
- Station guards near the lake and provide them with living quarters, equipment and transport.
- Place signposts which explicitly state the restrictions in effect.

Map 22



Map of Dashte Nawar Flamingo and Waterfowl Sanctuary.
Vertical dashed lines indicate meadows. Sanctuary boundaries are situated one km outwards from the shoreline.
Tentative site for warden accommodation indicated by large X .
scale approx. 1/1 250 000

- Prepare a management plan based on socio-economic and ecological data.

- Monitor the flamingo and waterfowl populations.

5.2.9 Darqad and Imam Sahib

Name: Darqad (Takhar) and Imam Sahib (Kunduz).

Designation: Proposed wildlife management reserve/nature reserve.

Location: Darqad: Takhar Province, about 80 km north of Taloqan, 37°25'N, 69°30'E. Imam Sahib: Kunduz Province, about 60 km north of Kunduz, 37°15'N, 68°50'E. Map 23.

Area: Borders not yet determined.

Environment: The two areas are situated on the floodplains of the Amu Darya Panj river. Little recent information is available. Darqad is at an elevation of 400-450 m. The areas are the last stronghold in Afghanistan for the endangered Bactrian deer (Cervus elaphus bactrianus) which used to be common all along the Amu Darya Panj river and its tributaries. The habitats at present occupied by the deer are the tugai vegetation on the river banks. This is dominated by Tamarix spp, willows (Salix spp) and reeds (Phragmites australis). Eleagnus spp trees are interspersed and in places constitute a forest.

Many cultivated fields occur along the river and on the islands between the Darqad and Amu rivers.

Besides the Bactrian deer, the areas are important for migrating waterfowl and for the rare pheasant Phasianus colchicus bianchii. Tracks of tiger (Panthera tigris virgata) were recorded in Darqad in 1967.

Status: Uncertain: the Darqad and Imam Sahib areas were declared as Royal Hunting Reserves with restrictions on settlement, hunting and agricultural practices, but there was never any official gazettement, nor a specific boundary description.

Value: The floodplains retain examples of the original tugai vegetation and are the last areas where the endangered Bactrian deer and Phasianus colchicus bianchii occur in Afghanistan.

Conservation problems: Although a hunting reserve was established it was never gazetted, and after the abolition of the monarchy it was occupied by settlers. The deer and pheasant are intensively hunted.

Action plan:

- Survey the river plains in both Darqad and Imam Sahib and select the most suitable areas for reserves. If feasible the islands between the Darqad and Amu Darya rivers should be selected because of their natural boundaries.

1. SOCIAL AND ECONOMIC BACKGROUND

1.1 THE COUNTRY

Afghanistan is a landlocked country of 652 263 km^2 sharing common borders with Iran, the USSR, China and Pakistan. The country rises gradually from the hot arid plains along the Amu Darya and in the Seistan basin at 400 m altitude, through the mountain ranges of the centre and northeast where there are numerous peaks in excess of 6 000 m to the highest point, Mount Zebak, in the Pamir (7 484 m) (Map 1). Rainfall increases from west to east and from low to high altitudes, but the high Pamirs are very dry. The vegetation therefore ranges from desert in the south and west, through steppes and dry woodlands in the centre and north to coniferous forest in the humid mountains along the Pakistan border.

The country is divided into 28 provinces, each governed by a Wali. The provinces are divided into Waliswalis and these in turn into [illegible] (Map 2).

1.2 THE PEOPLE

1.2.1 Origins

The population is ethnically diverse. The earliest known inhabitants were the Aryans who migrated from central and western Asia to occupy the Iranian plateau and Indian sub-continent between 3000 and 4000 B.C. By 2600 B.C. they dominated the area from the Aegean to the Indus and from the Aral, Caspian Pamir line to the Arabian deserts. Balkh was an important centre at this time. From 550-331 B.C. Afghanistan was incorporated as the Bactrian Province of the Achaemenid Empire; this province was the home of Zoroastrianism, one of the first monotheistic religions. In 331 B.C. the Achaemenids fell to Alexander the Great and during the following years Alexander established a series of garrison colonies throughout the area. In 50 B.C. Kushan tribes of northern Aryan origin invaded Afghanistan and dominated the area for the next 500 years. Islam gradually took over between 672 and 870 A.D. and gave rise to the Ghaznavid dynasty, the first great Islamic empire in Afghanistan, which reached its apotheosis under Mahmud of Ghazni who ruled from 998 to 1030 A.D. Mahmud's rule extended from western Persia to Kashmir and from the Amu Darya to the Ganges. The Ghaznavids were replaced by the Mongols from eastern Asia who ruled from 1220 to 1504 A.D. and whose most renowned leader was Ghengis Khan.

Subsequently the area was divided between the Moghuls of Mongol origin who controlled India and eastern Afghanistan and the Safavids of eastern Persia who ruled Herat and parts of the west and the south of the country. The Uzbeks also contended for the north. Afghanistan first came into existence as a political entity under Ahmad Shah Durani in 1747. The monarchy was abolished in 1973 and the Republic is now ruled by a socialist government.

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PREFACE

The present paper attempts to identify the key environmental problems facing Afghanistan and to determine the strategies that the Government could adopt to alleviate them. Only a limited amount of travel within Afghanistan was possible during the preparation of the report so the conclusions are based almost entirely on a study of published work and on discussions with specialists in the various sectors involved. It has also been possible to draw on knowledge of parallel situations in neighbouring countries. The report is concerned with the conservation of natural areas and other environmental problems are considered only in so far as they affect natural ecosystems. The scope of the strategy is therefore limited to:

1. The conservation of natural ecosystems and the maintenance of genetic diversity.

2. The sustained use of natural rangelands and forests.

Had it been possible to travel more extensively in the country other problems would certainly have been discovered and the emphasis of the report might have been different. There are many references to situations which would repay detailed examination in the field but this has not been possible. It is hoped, nonetheless, that the strategy gives an accurate assessment of the state of knowledge of the Afghan environment at the present time. The strategy is intended to be read by decision makers who are not specialists in environmental affairs; it has therefore been kept as brief as possible and has only considered fundamental problems. The background data upon which the strategy is based are presented in appendixes in a separate volume. The inspiration for this work comes from IUCN's "World Conservation Strategy". Circumstances have prevented the soliciting of ideas and comments from many of the country's environmental specialists. The strategy should therefore be considered a draft which can be improved in future versions.

Deterioration caused by over-use and misuse of natural areas is already affecting the quality of the lives of the people of Afghanistan. Action to alleviate the destruction of forests, over-use of rangelands and abuse of freshwater resources is urgent and the Government is urged to give these problems higher priority. The environment of western Asia has suffered more abuse from man over a longer period than any comparable part of the world; much of the damage is irreversible in the short term but there are many areas where action can produce results and it is hoped that this report will contribute a little to this action.

FO:DP/AFG/78/007
Technical Report, Vol. I

NATIONAL PARKS AND WILDLIFE MANAGEMENT

AFGHANISTAN

A CONTRIBUTION TO A CONSERVATION STRATEGY

Volume I: TEXT

UNITED NATIONS DEVELOPMENT PROGRAMME

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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A F G H A N I S T A N

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Report prepared for
the Government of Afghanistan
by
the Food and Agriculture Organization of the United Nations
acting as executing agency for
the United Nations Development Programme

based on the work of

J.A. Sayer
Team Leader/Ecologist
and
A.P.M. van der Zon
National Park Planner

UNITED NATIONS DEVELOPMENT PROGRAMME

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FAO. National Parks and Wildlife Management, Afghanistan. A Contribution to a Conservation Strategy, based on the work of J.A. Sayer and A.P.M. van der Zon. Rome, 1981. 2 vols., 25 maps. FO:DP/AFG/78/007, Technical Report.

ABSTRACT

In 1972 the Government of Afghanistan requested the assistance of the UNDP and FAO in the conservation and management of the wildlife and natural areas. Initially studies were made on larger ungulates, which are much sought after for hunting by sportsmen. Later assistance was given in establishing a system of protected areas, strengthening the Department of Forests and Range, implementing management plans for established conservation areas and drawing up an action plan or strategy for conservation.

Th[illegible] the policy options open to the Government concerning the use of the natural environment, and of their implications. It gives a description of the country with its agricultural economy, dominated by livestock grazing and heavy reliance on traditional fuelwood, which is disastrous for the natural environment; the physical and biological environment; the land use of natural areas, dominated by the over-utilized rangelands; the forests; the wetlands so important to migrating birds; the endangered wildlife; legislation; and environmental education. At the end, a description of the natural conservation sites is given with the actions recommended.

The main recommendations for utilization of the natural environment are based on the goals of maintaining the ecological processes and life-support systems on which human survival and development depend, of preserving genetic variety, and of ensuring a sustainable utilization of all natural ecosystems and species. They are as follows:

1. An environmental unit within the Ministry of Planning should be established for the promotion of interministerial coordination of all environmental activities and matters.

2. Management of and research on the rangelands, forests and conservation areas should be extended.

3. A series of natural areas representing the Afghan ecosystems and genetic variety should be established, and the conservation capability of the Department of Forests and Range and the training of its staff should be improved.

The appendixes include lists of mammals, birds, reptiles and amphibians and an extensive bibliography.

The Food and Agriculture Organization is greatly indebted to all those who assisted in the implementation of the project by providing information, advice and facilities.

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